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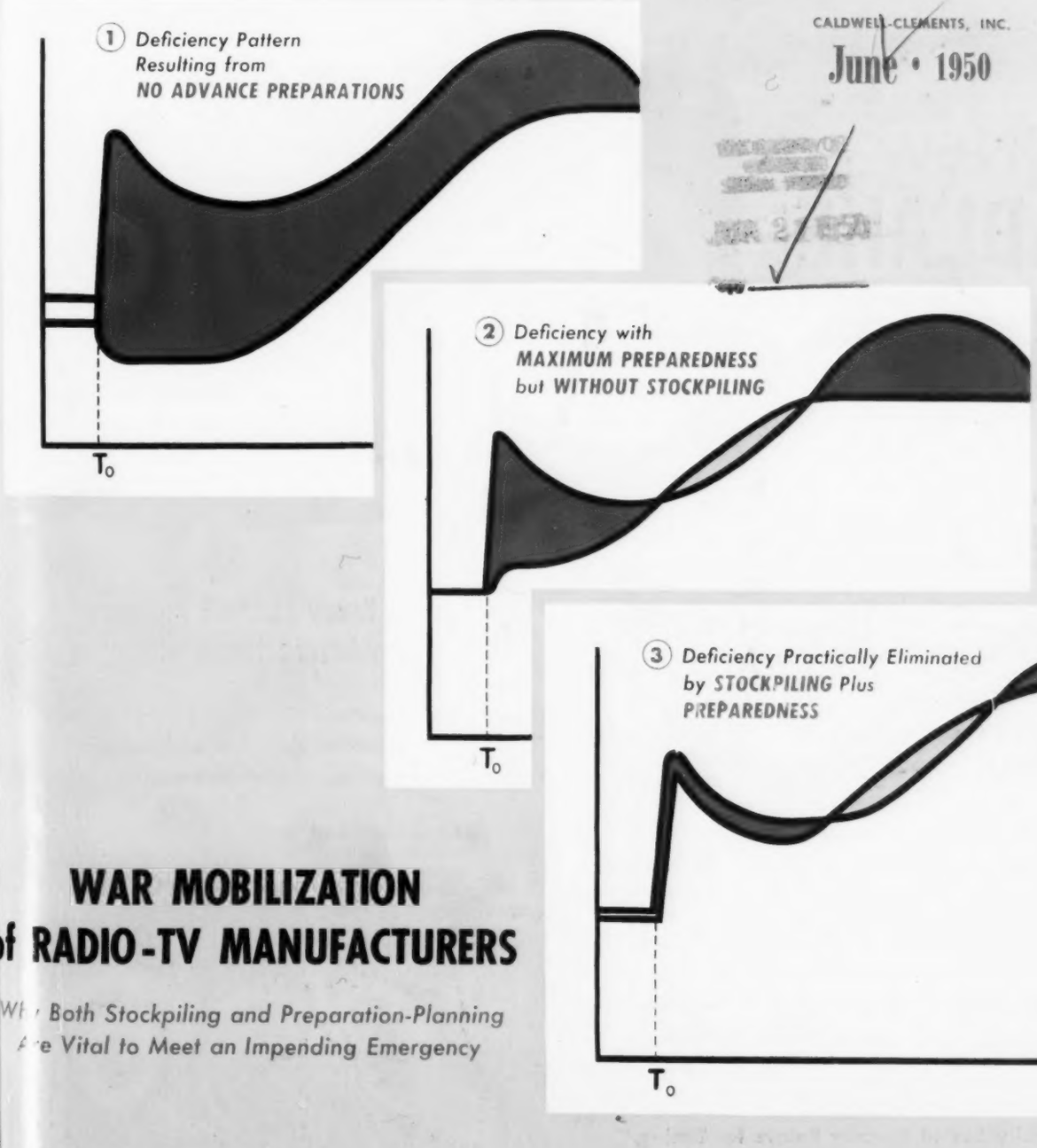
1 Deficiency Pattern Resulting from NO ADVANCE PREPARATIONS
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T0
Tv

WAR MOBILIZATION of RADIO-TV MANUFACTURERS

Why Both Stockpiling and Preparation-Planning Are Vital to Meet an Impending Emergency

SPECIAL in this Issue —

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Edited for the 15,000 top influential engineers in the Tele-communications industry, TELE-TECH each month brings clearly written, compact, and authoritative articles and summaries of the latest technological developments to the busy executive. Aside from its engineering articles dealing with manufacture and operation of new communications equipment, TELE-TECH is widely recognized for comprehensive analyses and statistical surveys of trends in the industry. Its timely reports and interpretations of governmental activity with regard to regulation, purchasing, research, and development are sought by the leaders in the many engineering fields listed below

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JUNE, 1950

COVER: PROBLEM OF MOBILIZING RADIO-TV MANUFACTURERS FOR WAR is graphically depicted by the three cover diagrams. In the first, the upper curve shows the demand by the Armed Forces on the Radio-TV Industry for new communication materiel. To indicate the time of outbreak of hostilities. The lower curve indicates how Industry will respond to the demand, while the red area between the two curves shows the tremendous deficit in output. Means of reducing this deficit are shown in the other two diagrams where the effects of preparedness planning and stockpiling are evident. Here also, the yellow portions of the diagrams show when Industry actually produces more than the demand. See the accompanying article for details on how curve shapes are generated.

WAR MOBILIZATION OF RADIO-TV MANUFACTURERS — *S. K. Wolf and W. H. Tetley* — 16
Stockpiling and preparedness-planning are vital; tremendous production needed in event of a National Emergency

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Final statements made before FCC. Both RCA and CBS present fresh developments in effort to win decision

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TELE-TIPS

EMPIRE TOWER ANTENNA for 5 TV stations 1450 ft. above New York, is now under construction, but will be given ground-level test first, to check radiation, interaction, etc. When time comes to install great new 200-ft. mast, a WNBT antenna boom will be swung to one side at 60-deg. angle, to clear way for new 200-ft. vertical steelwork. As this construction progresses WZJ-TV batwing antenna will be carried upwards day by day on this new permanent steelwork, without interruption to station's broadcast.

L-S—M-F-T—The slogan Long Service—in spite of Moisture, Fungus, Temperature is a keynote of present-day military designs.

AEONIC STABILITY, a term we heard some years ago, then seemed to be the thing most in the minds of component designers. While stability over the ages is something that may be more of a dream than a reality, circuit reliability and absolute freedom from maintenance worries would cause a wide introduction of electronic equipment in hundreds of large-scale operations. It is a big goal but one that will bring an increased market for tubes and components in the now 2% industrial electronic field.

TUBE RUGGEDNESS—Dr. Weeks (Raytheon) reports that research on miniature and subminiature tubes has actually improved tube ruggedness. Several new factors have affected quality but these are controllable and other characteristics have been benefited. Small size has proven compatible with long life and reliable performance.

VISITORS TO EUROPE who have been expertly inspecting TV services abroad, report with admiration for the fine picture quality of the BBC's double-sideband 405-line television around London. Also they have been impressed by the Dutch TV. But the French 800-line picture had so many shortcomings of performance and roughspots generally, it was felt to fall far below acceptability for this side of the Atlantic.

NOW RELIABILITY—Engineering students have long been taught the value of efficiency—the most output for the lowest amount of energy applied. The latest objective however, is reliability in radio-electronic circuits, the attainment of which requires quite opposite design rules, in many cases, from those used to get efficiency.

EMPHASIS ON AUDIO—A major TV broadcasting network is now engaged in an all-out engineering effort to maximize program sound quality and to streamline audio technics in their studios. Orders for the newest and most modern equipment are now being placed. Feeling apparently is that picture transmission quality has now reached a point where any immediate further improvement involves the law of diminishing returns.

SUPERCONDUCTIVITY. Metal conductors of tin, lead etc. lose their resistance at very low temperatures. To make practical use of superconductivity, physicists have searched for a substance which would be superconducting at ordinary temperatures. Absence of resistance would open a new world to the radio and communications engineer. Best material found has been columbian nitride, but

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This picture was taken in the Bridgeport office of The Southern New England Telephone Company, one of the 22 operating telephone companies which the Laboratories serve through the Bell System.

Cutting Board for Telephone Costs

Few of these tools have sharp edges. But they are powerful cost cutters. Whenever a telephone craftsman reaches for one, he finds the right tool ready to his hand. There's no time wasted trying to do a complicated job with makeshift equipment.

Most telephone tools are highly specialized. 90% of dial system tools were designed by Bell Laboratories. Each saves time in maintenance, installation or construction.

There are tools with lights and mirrors to work deep within relay bays; tools to brush, burnish and polish; tools that vacuum clean — even a tool to weld on new contact points without dismantling a relay. There are gauges to time dial speeds, others to check spring tension. Some look like a dentist's instruments. Some you have never seen.

Keeping the telephone tool kit abreast of improvements is a continuing job for Bell Telephone Laboratories. It's another example of how the Laboratories help keep the value of your telephone service high, the cost low.

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TELE-TIPS (Continued)

even this requires a temperature of 15 degrees above absolute zero (—459.6 degrees F.) to become superconducting. This compound is now the subject of study at Columbia University and Johns Hopkins. Columbium nitride has been used as a sensitive detector of infrared radiation.

RESISTORS — Recent developments in deposited-carbon-film resistors have produced a product in the precision-resistor field that has advantages over wire-wound units, especially at the larger values.

UNITIZED equipment designs, made up of a number of groups of items each associated with a single function are receiving much attention. Communication apparatus designs by Motorola embody several notable features along this line.

WASTEFUL DUPLICATION—The results of our wartime research and development program, once so secret that workers were sometimes required to rediscover, the hard way, answers to problems worked out by others in the next room along the hall, have now been elegantly published to the whole world. It would be a smart trick to have some plan worked out and tried now for separating out the small tedious problems from the general project and so by consulting a general information depository which could be established under any level of secrecy classification, duplication of efforts could be saved.

STANDARDIZED solutions to details of a problem would also promote standardized circuits standardized components, servicing and operating procedure. All this cataloging could be handled, if desired, without tipping off the main objectives of particular projects even to other groups operating under similar classification.

"BLESSINGS" OF GOV'T PHONE OPERATION—The home phone rate in Paraguay which was $3.15 monthly for unlimited services was raised to $8 on April 1st. This is almost three times the previous rate. A government bureau operates the service—'nuff said!

LOOKING BACKWARD, declared Col. E. M. House, "it appears to me that nearly every piece of good luck I ever had led directly to a bad result; and all the things I thought were bad luck when they happened, in the end turned out to be the foundation of opportunity."

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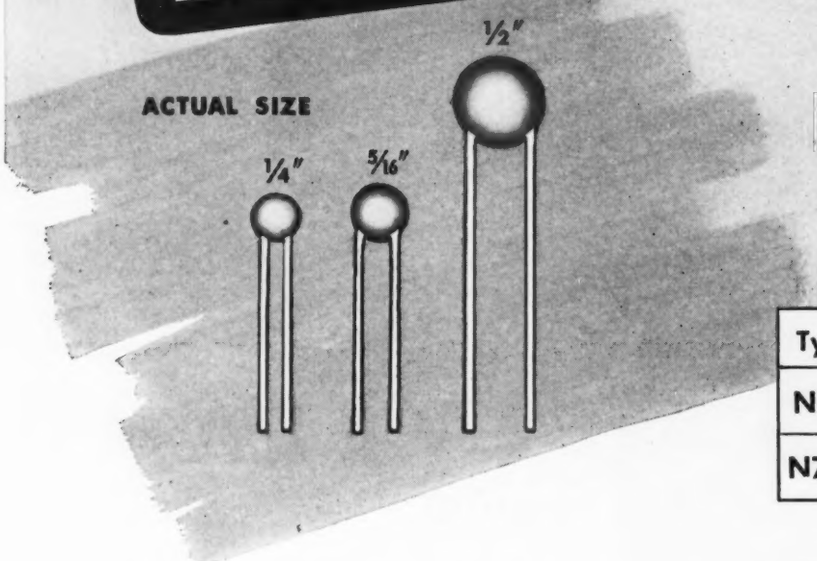

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NPO		5 TO 15	15 TO 30
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Available Tolerances: ±5%, ±10%, ±20%

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GP Series DISCAPS feature small size, low self inductance, higher working voltage (600 V.D.C.), low power factor, greater mechanical strength and faster production line handling. Their low cost, plus their inherent quality characteristics make GP Series DISCAPS attractive to all manufacturers of high frequency equipment. Type GP Series DISCAPS are available in a variety of capacities and tolerances to suit most every requirement.

Are You Using the Now Famous Type B-GMV By-Pass Series Discaps?

Approved by leading makers of TV sets and tuners, RMC Type B-GMV DISCAPS are now available in the following capacities: .001, .0015, .002, .005, .01, 2x.001, 2x.0015, 2x.002, 2x.004, 2x.005 MFD; also Bi-element shielded section 2x.0015, 2x.005 and 2x.01 MFD. They feature small size and low self inductance and exceed GMV capacity at 85°C with 250 applied D.C.V. Capacity change between room temperature and 65°C is only + 18%,—0%.

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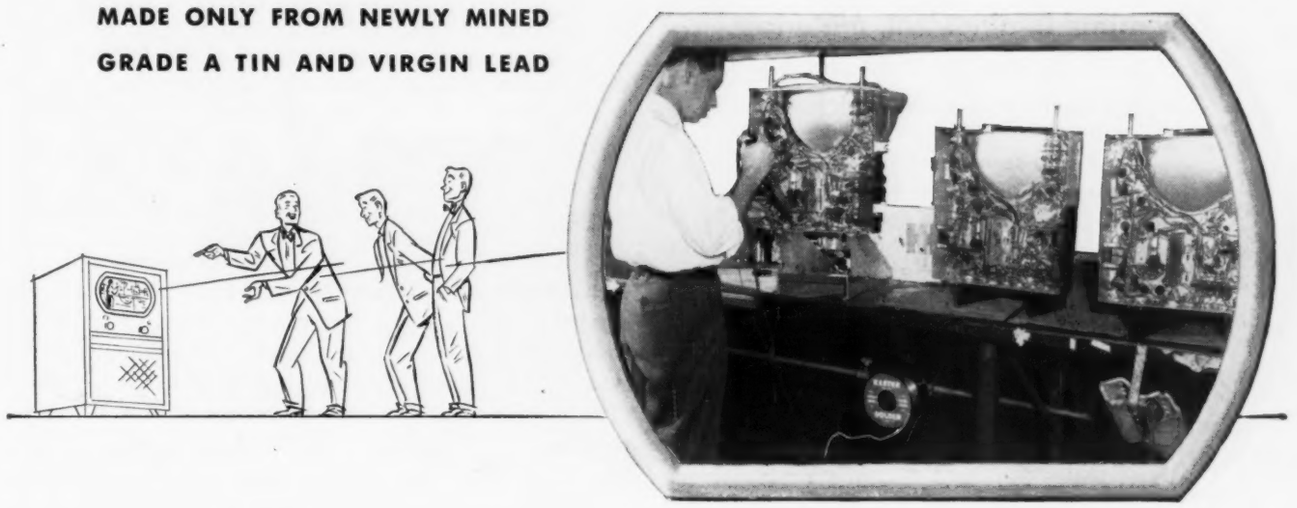

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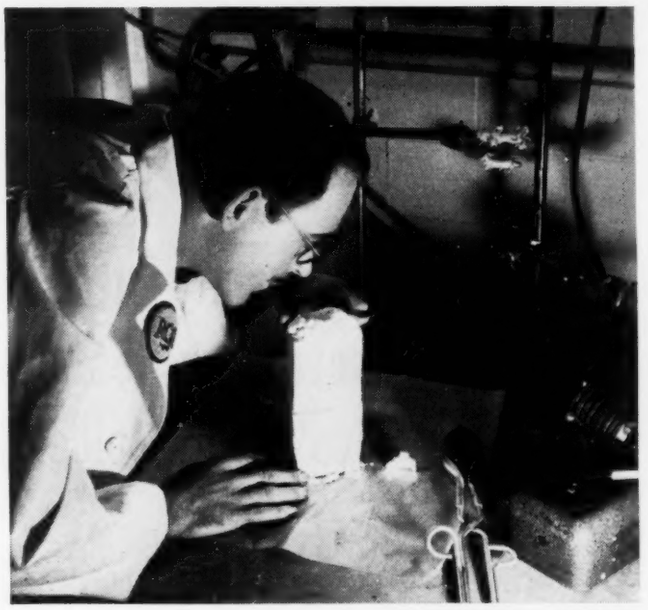
Photos from the historical collection of RCA

• *"Specpure Laboratory,"* said a sign at RCA Laboratories, *"Do Not Enter. Dust Is Our No. 1 Trouble-maker."* On the floor were moistened rugs to trap shoe-borne dust. Scientists and technicians had to change to clean white clothing before entering the room.

Purpose of this meticulous housekeeping was to provide a place where no speck of dirt would handicap the work in progress. RCA scientists were studying *luminescent materials*—seeking ways to produce them in bulk, while maintaining utmost quality and purity. Not even a speck of foreign matter could be tolerated. One part of copper *in ten million* will show up as green spots on a television screen.

In a special vibration-free room, *air-conditioned—and with temperature and humidity evenly controlled—tubes move at a snail's pace along this settling belt, while the luminescent coating settles on the face of the bulb in a delicate, film-like covering—a flawless surface, smooth and uniform.*



This block of luminescent material, *energized by ultraviolet light, provided illumination for this photograph. Luminescent materials of the highest purity are produced in bulk at RCA Tube Plant.*

Although phosphors have been known for centuries—since even sugar, salt, and diamonds have been found to have luminescent properties—little intensive research was done until scientists began seeking to perfect these glowing materials for use on the screens of television receivers. A scientist at RCA Laboratories, in the Specpure Room, was one of the first to develop the fundamentals for a way of making luminescent materials in bulk for television.

This development is one of the reasons why, at RCA Tube Plant in Lancaster, Pa., they can now be made by the tankful! Even in mass production, each "batch" has uniform characteristics. White light, of the type most suitable for creating television pictures, is produced by mixtures of luminescent materials combined in exactly the correct proportion.

Guarded at every step against any trace of contamination, these phosphors are deposited in a delicate film-like coating on the faceplates of television tubes . . . where they cling to the glass by a form of molecular attraction. Excited by an electron beam, they glow with a brilliant white light and thus produce the crisp black-and-white pictures we see on television.

To television, the phosphors developed by RCA scientists are as important as paint is to a painter. The face of the kinescope tube is the "canvas." A picture appears as a visible image when the electron gun acts as a "paint brush" to create patterns in the phosphors!

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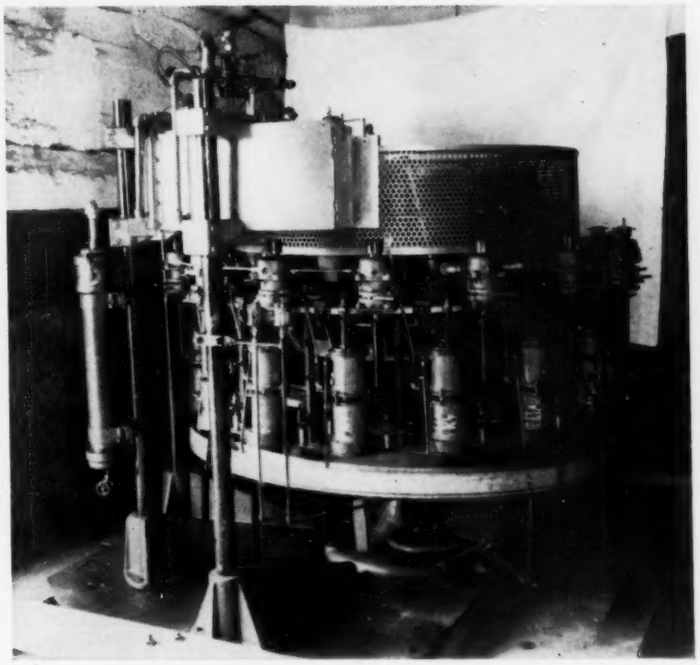

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ARCING BOTTLES. GE. Stanlifting mechanism to lift work up and down inside bottle.

BULB-PIERCING & TABULATING MACHINE. Mfd. by Kahle Eng. (any standard transmission tubes or thyratron.) 1/20 hp. motor, 1/60/110 v. gear drive, reduced to 108 rpm.

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FLARE MACHINE. Mfd. by Kahle Eng. Co.

VACUUM FIRING EQUIPMENT. Mfd. by GE.

WIRE STRIPPING MACHINE. Model 9E, for stripping wire up to 8 gauge. Bench type with motor.

SEALING & STEM MACHINE. 16 heads. Mfd. GE, ¾ hp. GE motor.

ELECTRIC FURNACE. Contains electric control and resistor.

EXHAUST MACHINE. 16 heads. UNUSED, by Kahle Eng. Co., complete with 16 metal liquid air traps, 16 compression heads, 16 water-cooled compression levers with rollers, 7 mercury pumps D-239, 13 terminal boards, five GE timers.

INSULATOR EQUIPMENT. GE, consists of welding equipment.

GLASS CUT-OFF MACHINE. McCreery Machine Wks. 3" diamond disc. cutting wheel mounted under table.

CARBONIZING EQUIPMENT. GE, one water-cooled cylinder.

COMBINATION STEM & SEALING MACHINE. Dual drive, automatic operation.

MARKING MACHINE B. B. Marker Machine Company Model P. L. for labeling electronic tubes. With ½ hp motor coupled to reduction gear.

GRID WINDER & ROLLER WELDER. GE, for side rod tungsten welding.

SET: SUCTION & SAND BLAST UNIT. By Amer. Foundry Co. Model 1B, 3 hp. GE motor.

GAS PURIFYING FURNACE. GE. Cat. #823622SG1, 1400° F. Brown pyrometer, panel & timers.

AUTO BUTTON STEM MACHINE. 1-12 Head, complete with fires—ready for immediate operation.

BAIRD. 4 slides, #00 reducer, with motor and oil pump.

FLETCHER Centrifuge.

GAS FIRED OVEN FURNACE. #210, AGF.

FEDERAL DUST CLASSIFER. Laboratory unit.

STURTEVANT GAS BOOSTER with diaphragm regulator, bypass and ½ hp. motor, 110v. Many others.

8 8x8 KINNEY VACUUM PUMPS, with base, no motors.

AIR BLOWER. With motor, GE, HP:11, 3 phase, Blower, Type: MM-26-450-3.5 lbs. 3500—many others.

Subject to prior sale.

Many others for glass working for laboratories, lamp & neon use.

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OUR INDUSTRY IN A RE-ARMAMENT PROGRAM

Tremendous Demands Foreseen. The "Input-Output" Method of Calculating Requirements

If another war overtakes the United States, the radio-electronic requirements of the Armed Forces may total up to five-fold anything our industry witnessed in World-War II! So varied and tremendous have become the military uses of radio and tube circuits that existing factory facilities will have to be enormously expanded and speeded.

On following pages, in the important article by Col. S. K. Wolf and his Munitions Board associates—which should be studied carefully by every radio executive engineer—the authors discuss the underlying reasons why mobilization planning for our radio industry presents special problems not encountered in the majority of war commodities. For the process of accurately estimating requirements and assessing industrial potential needed in the waging of a modern war involves computational problems which would be insurmountable using past techniques.

Reasons for Special Handling

Experience indicates that the radio-electronic field has required special handling in the past and will continue to in the future. In general, the estimation of requirements and assessment of industrial potential appears to be the underlying cause for this. It is affected by the following factors:

a. The problem of definition and classification.
b. The tempo of research and development.
c. The diversity and non-homogeneity of various supporting consumer goods.
d. Complex interdependencies existing within the industry itself.
e. The anticipated inability of production to cope with the wartime military demands.
f. The diversity and non-homogeneity of the final finished goods.
g. The complex interdependencies inherent in the military activities which generate the Armed Forces requirements.
h. Variety and multiplicity of claimants.

In Colonel Wolf's studies, the interesting idea of looking at the radio industry from a kinetic standpoint has been developed. Thus our industry can be considered as a system having inertia, compliance, and friction. This dynamical system, which is normally in equilibrium with peacetime supply and demand, must at the declaration of war respond to the impact of all-out war production. Our industry is also somewhat different from an ordinary dynamical system as it must respond to a demand which requires an internal rearrangement.

Some Analogies of Conversion

This can best be explained by considering a power amplifier which normally has an output of 100 watts at 400 cycles and little or no output at twenty megacycles. Suddenly this amplifier is required to produce 2,000 watts at twenty megacycles and little or none at 400 cycles. Such a feat can be accomplished first by maintaining an expensive wide-band amplifier in constant readiness for such an emergency; or by having drawings and parts available to modify the amplifier when and if the time comes. If we choose the latter method it must be kept in mind that it will take a finite time to modify the amplifier and that its output has a finite upper limit.

We can consider our industry then as a dynamical system which may be modified in time of emergency; and that this modification has limitations, and will take time. Industrial Preparedness Planning deals with these modifications of industrial systems.

In the final analysis, however, one thing is certain. Both requirements and potential must be reduced to a lowest common denominator such as the "radio-electronic dollar" or radio-electronic "manhour". It is most essential that all classification systems be transformable one into the other, and be reducible to this lowest common denominator. As pointed out in our article, this becomes a task requiring considerable skill and patience. The vastness of the military bill-of-goods makes it essential that the optimum method of analyzing and subdividing both military requirements and industrial production be sought.

The RADARSCOPE *Revealing at a Glance.*

FCC OUTLOOK

BIGGEST INDUSTRY BOOM—"Thawing" of television station freeze by FCC, which Chairman Wayne Coy has expressed hope will come by the end of this year, will bring one of the biggest booms in American industrial history, it was predicted by Commission Vice Chairman Paul A. Walker in address at Ohio State University before annual Institute for Education by Radio. Both Chairman Coy and Commissioner Walker predict possibility of 2,000 television stations on the air in five years if construction can resume early next year.

RE-ARMAMENT

SPEED OF REACTION—In a patrol bomber, involving a total material investment of over $1,300,000, there are some 45 complex electronic gears, costing around $180,000. They contain some 25,000 individual components, all of which must be completely reliable and capable of withstanding many hazards not found in the usual radio-set design.

It may be wondered why the need for all this gear. In many industries, such as certain forms of manufacturing and the aviation fields, human responses are so slow, relative to the requirements of the job, that human capabilities have been left far behind. The need for their decisions and responses is over, long before human faculties can react.

Tube-actuated thinking processes are now tied up to other systems that do the work, all before the resulting action is too late to be of value.

MICROWAVES

TEST UPPER BANDS—The industrial radio services such as petroleum, power utilities and forest products should continue their mobile radio operations in the upper frequencies for a considerable period as kind of a "fact-finding type of operation" to ascertain the propagation characteristics and interference problems between stations and systems, Glen E. Nielsen, Chief of the FCC Engineering Safety and Special Services Division, advised in a recent address before the Petroleum Industry Electrical Association convention at Houston, Tex. Mr. Nielsen warned that it will require months or even a year to determine final rules and standards by the Commission in the 400-500 megacycle region. He urged the mobile radio services, especially the industrial group, to plan for fixed-station operation above 952 megacycles as a permanent "home". Increasing difficulties in interference with television is occurring to mobile service stations in the 72-76 MC band, it has been discovered by the FCC.

J. M. Lang and Dr. W. R. G. Baker inspect G.E.'s new 24-inch television picture-tube, shown mounted on a glass-to-metal cone-sealer. Production of giant tube will get underway this Fall.

TELEVISION

TV-SET EXCISE TAX REJECTED—Big boost for continued huge sales of television receivers was foreseen in the decision of the tax-legislating House Ways and Means Committee to reject President Truman's proposal for the levying of a 10-per-cent excise tax on television receivers. The House Committee, despite the efforts of the Truman Administration to raise tax revenues, was understood to have felt the imposition of the 10% excise levy would hamper the growth of this "infant" industry which promises to contribute so much to the nation's economy in employment and entertainment of the public. Much credit to the House Committee's decision goes to the Radio Manufacturers' Association which presented a united radio industry front against the tax. The House Committee also exempted from excise taxes the electronic-radio-radar equipment, designed for communication and navigation especially in aviation and sold to the Government.

RELIABILITY

AGING OF TUBES—Report on maintenance on one of the M.I.T. electronic computers seems to indicate that changes in tube characteristics with aging causes several times as many failures as all other circuit troubles combined. Engineers designing present-day circuits may do well to follow up the phase of design where the circuit is gotten to work, with a second phase—keeping it working with large changes in tube characteristics, and a third phase—selecting components that have a long (20 years is none too short) life expectancy.

We find two schools of thinking in this last problem—is it necessary to redesign regular components to obtain this reliability—or will the present-day components of the better class be satisfactory if derated to very light loading. There seems to be no direct answer here.

MINIATURIZATION

NEW TUBE CONSTRUCTION—The trend to smaller sizes in tubes has brought about the development of new techniques which have often proved more efficient than previous methods. A typical example is in G E disc seal tubes where a flat disc cathode, an ideal shape for many types of tubes, is supported by a thin tantalum foil cylinder (or sometimes fernico or molybdenum) about ½ mil thick. Satisfactory rigidity with a minimum of thermal conduction is afforded, so that the discs can be operated at 800°C without excessive loss of the seal.

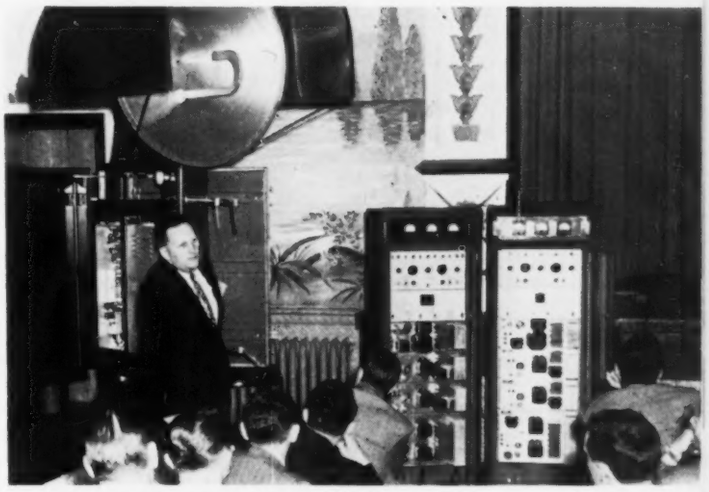
CIRCUITS

VARIABLE FREQUENCY oscillator drift has long been a problem that has defied permanent solution. Each set design has usually reopened the subject and new experiments have to be set up to locate each of the sources and drift trends. The drift may follow different laws at various parts of the frequency range so compensation with fixed capacitors of the temperature sensitive types may be only partially effective. One item that prevents the orderly application of theoretical values of compensation lies in the non-linear drifts in the usual inductance—radial expansion being influenced mostly by the wire temperature and axial changes by the expansion of the winding form. An interesting design suggestion that offers some promise in inductance stabilization is a metallized winding on glass developed by Corning. Not only is the temperature drift very low but what is left follows definite rules so that if additional compensation is needed it can be readily computed.

NEW MATERIALS

MICA SUBSTITUTES—Early amateurs (pre World War-I) took great pride in their large glass-plate condensers. Long abandoned, now after a third of a century new research as to low-loss glass compositions may reopen this field for a mica-substitute in capacitors. Several other mica substitutes are also being eyed by designers. One—already marketed, of laminated vitreous-enamel silver-sheet sandwiches, has produced a capacitance having superior characteristics in some applications. Polystyrene insulated capacitors with styrene film dielectrics have also been proven in applications where large capacitances are needed, where abnormally high temperatures are not reached.

A new lithium-aluminum silicate ceramic, called Stupalith, has been marketed having great capabilities for withstanding large temperature cycles. Repeated cycles from 2000° Fahr. to quenching at the temperature of dry ice, are easily handled. Another feature is that its temperature expansion can be readily controlled in processing at a negative value, through zero, up to positive values as required. It can be fabricated by any method used with the steatites.



Henry Magnuski, chief research engineer of Motorola's Communications Division, is shown demonstrating microwave equipment to Chicago section of the Armed Forces Communications Association. Cabinets at right are the power supply and control units. Above the RF housing is a parabolic antenna assembly.

INTERNATIONAL

ABOVE THE 49TH PARALLEL our Canadian cousins are experiencing an influx of British radio firms. Tempted by the lush US market, and better facilities and working conditions, many British companies are showing interest in Canada. While the major US manufacturers are already firmly entrenched with subsidiaries, the "Old Country" has been less strongly represented. Probably due to economic and general living conditions in England the trend is now quite pronounced. Indications were noted at the recent IRE Show that four or five companies, neither exhibiting nor producing on this continent at present will probably open plants in Ontario soon. Present US import duties operate against foreign-produced radio equipment, for imposts of 40%, or even more, raise the US price way above domestic equipment. However, mass production on a larger scale in Canada may soon bring prices down, and offer competition to home manufacturers. But as long as the imported equipment uses non-US standard components the threat should not be very great.

FACSIMILE

RADIO NEWSPAPER—The publication and delivery of a newspaper to the public by radio should become an accomplished fact with the reduced cost of facsimile receivers for home use resulting from quantity manufacture of such instruments. This is expected as regular programs become available on a broadcast basis, declares John V. L. Hogan, New York. "Facsimile," he says "is just beginning to go into general use. More or less like television, the broadcasting of facsimile programs will first be directed to receiving sets and display recorders located in public places such as hotel lobbies, airport terminals, theatre lobbies, etc.

War Mobilization of Radio-TV Manufacturers

Why both stockpiling and preparedness-planning are vital. The tremendous production, plant expansion, and conversion needed in event of a National Emergency

By Col. S. K. WOLF, USAFR
Executive Director, Electronics Division

and

Col. W. H. TETLEY, USAF
Air Force Director, Electronics Division

Munitions Board, Washington, D. C.

THE fundamental concept behind our present policy of national security was enunciated most clearly by General Omar Bradley recently. In speaking at Washington, March 8, he pointed out that the peacetime security of the nation must be based on two factors: (1) The so-called armed "forces in being", and (2) A war potential which can be mobilized swiftly in the event of hostilities.

These "forces in being" must be sufficiently strong and well supported to prevent the loss of war at the outset. This would permit the orderly and swift expansion of our reserve potential necessary to insure final victory.

Under these ground rules the Munitions Board is confronted with two tasks—that of coordinating the logistic planning necessary to insure the adequate support of the "forces in being" and that of unifying the plan for swift and orderly expansion of our peacetime industry to meet wartime requirements.

The radio-electronic commodity group is faced with several restrictions which complicate its fitting into this overall plan. Four of these are especially noteworthy:

(1) There is an upper limit beyond which it is impractical to expand the industry.

(2) The increase in the importance of radio-electronic equipment as a war commodity will most certainly create a demand which will far exceed this upper limit, without adequate preparedness planning.

(3) New and complex weapons will dig deeply and unexpectedly into the production potential. The effectiveness of these weapons must be weighed against the effect of the disruption they might cause to the war economy.

(4) There exists the threat of having undetermined amounts of our industry wiped out during the first few hours of hostilities.

STOCKPILING

"Stockpiling" is used here in its broader sense of "having under way" or "in the process of making", and is not limited to its common use of "stored components or end equipment". Stockpiling specifically includes the building of tools requiring long time to manufacture, pilot production, and spreading of "know how".

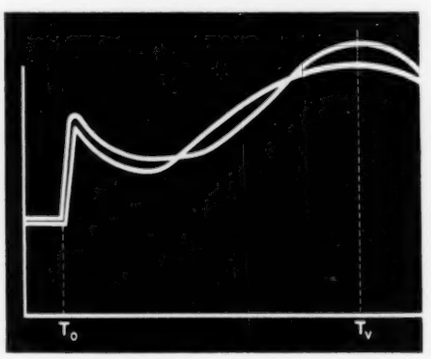
We think of it, as used here, more as a triggering operation, than as the warehousing of finished materials.

Demand and Response

The method of analysis we propose to use is essentially that of plotting the demand and resulting response curves of an industry and comparing them graphically. The geometry of these plots should indicate fields where improvement is most feasible.

It will be recognized that radio-electronics must be treated as an important war commodity. In what follows the idea of looking at the industry producing this commodity from a kinetic standpoint will be developed. The industry can be considered as a system having inertia, compliance, and friction. This dynamical system, which is normally in equilibrium with peacetime supply and demand, must at the declaration of war respond to the impact of all-out war production. This industry is somewhat different from an ordinary dynamical system as it must respond to a demand which requires an internal rearrangement of the elements which comprise it.

This can best be explained by considering a power amplifier which normally has an output of 100 watts at 400 cycles and little or no output at twenty megacycles. Suddenly this amplifier is required to produce 2,000 watts at twenty megacycles and little or none at 400 cycles. Such a feat can be accomplished



Demand and production vs. time curves showing how materiel deficiencies are reduced by stockpiling and preparedness

first by maintaining an expensive wide band amplifier in constant readiness for such an emergency; or by having drawings and parts available to modify the amplifier if and when it should be necessary. If we choose the latter method it must be kept in mind that it will take a finite time to modify the amplifier and that its output has a finite upper limit.

We shall consider the industry then as a dynamical system which may be modified in time of emergency; and that this modification has limitations, and will take time. Industrial Preparedness Planning deals with these modifications of industrial systems.

The quality of the amplifier is a measure of how well response (or output) follows the shape of the input (or demand).

Likewise the quality of our industrial preparedness can be judged by comparing the production response with the demand characteristic.

The Demand Curve

Let us first examine the type of demand imposed by the plan suggested by the Chairman of the Joint Chiefs of Staff. The shape of the demand will be governed largely by the following factors acting in proper time phase:

(a) Initially there will be a sud-

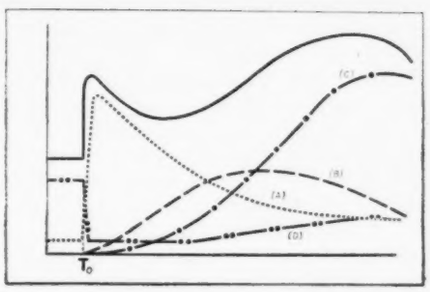


Fig. 1 (a-e) Elements comprising the demand

den surge caused by the immediate demands of the Armed Forces in existence. There will also be the so-called "pipeline requirements" which is the name given to the filling of depots, warehouses, marshalling yards and other agencies which must be stocked before military supplies can be started moving. These initial requirements are not unlike the flow of current into an uncharged condenser, consequently the curve can be expected to have the shape of Fig. 1a.

(b) The initial demand is followed by the more gradual requirements for mobilizing and training the bulk of our fighting forces. This demand will have a gradually rising characteristic which will drop off as the optimum number of troops are committed for action. This curve can be expected to appear as 1b.

(c) As the trained troops are sent into combat, they start consuming expendables and wearing out basic equipment. This demand will be a function of the numbers committed and roughly proportional to the area under the preceding curve. This is indicated in Fig. 1c.

(d) The need of supporting the war economy is vital. An adequate proportion of all production must be allocated to keep production moving. This is indicated by the curve 1d.

When the preceding curves are added together in the proper time phase they produce a total demand. The additional of these curves is represented by 1e and constitutes the type of demand confronting industry at the outbreak of hostilities.

A study of industry's response to this impact forms a basis for industrial preparedness planning.

The Response Curve

An accompanying sketch represents the response of an unprepared industry to a sudden and unusual demand. The impact of mobilization most certainly will be sudden, and the lack of similarity between the wartime and peacetime product certainly makes it unusual. An unprepared industry is one which has not been subjected to industrial preparedness planning.

Production prior to time T_o is reasonably stable and in equilibrium with peacetime civilian and military requirements.

Production subsequent to T_o, however, is fairly unstable, and there is considerable time lag before equilibrium with the war economy is approached.

Another sketch represents the average or mean value of this random function. This, in some respects, resembles the response of the power amplifier.

At some arbitrary time T_o this industry is suddenly confronted with the problem of manufacturing items which often differ widely from its usual peacetime products, and the quantities are far in excess of its capacity. The initial reaction is to call a halt to its present production and immediately convert to the new. This very naturally causes a dip in the production rate of many luxury and entertainment items.

There then follows a period of hesitation, during which production can be expected to fluctuate violently about a low average value. At sometime T_1 the average value of output starts to increase at a fairly constant rate while the actual value continues to oscillate either side of the mean.

Towards T_m the industry reaches maximum capacity, the saturation point. Expansion beyond this point is negligible for the period with which we are concerned. As more talent is drawn off for the armed forces, this production could possibly drop off.

Preparedness planning calls for improving the response of industry by minimizing the rise time or period to achieve maximum production; and by maximizing the area under the expansion curve. This area represents the total goods produced.

Let us now examine the geometry of the problem and interpret the possible geometrical improvements in terms of industrial planning factors.

a. Production prior to time T_o is governed by the peacetime supply-versus-demand relationship for this particular commodity. Our only hope of increasing V_o is to superimpose an increased peacetime military demand on the system. This is referred to as first degree planning on Fig. 3.

b. The behavior at point T_o is of particular importance as our production response drops at this point. Two major factors bring about this situation:

(1) Up to this time the goods produced were essentially peacetime products for which the wartime consumption must be curtailed.

(2) At time T_o it is anticipated that our industry will be attacked, and it is reasonable to assume that a part of the facilities producing the commodity in question may be wiped out.

It would aid our cause consider-

Fig. 2: Effect of instability on overall production. Inset shows average production increase by minimizing various loss factors

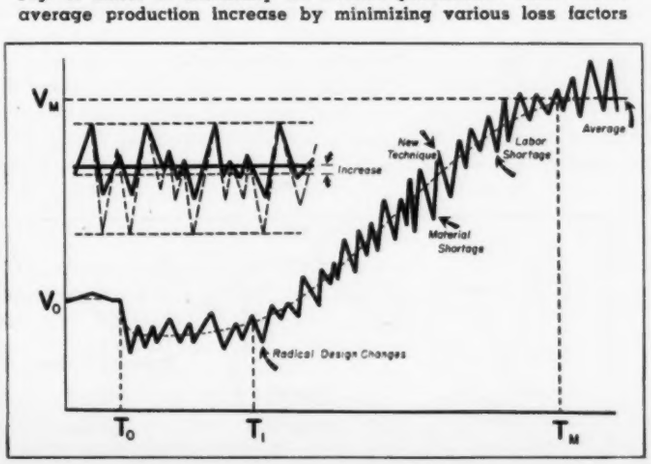
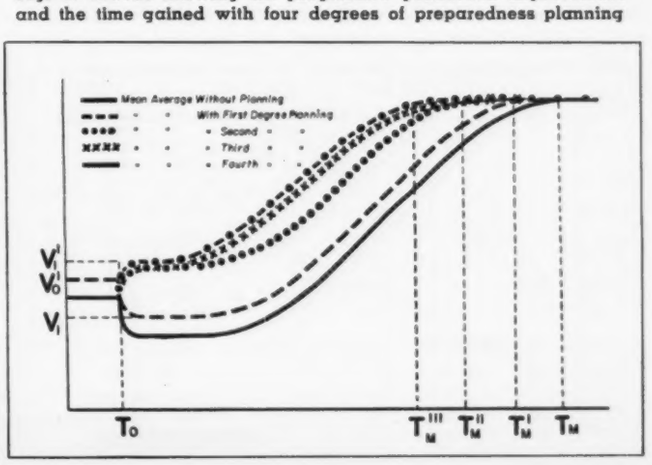


Fig. 3: Curves showing the progressive production improvement and the time gained with four degrees of preparedness planning



ably if production could take a sudden positive jump at T_o, rather than a slump, so let us ascertain what planning factors would bring this about.

1. *Education.* It is essential that the manufacturer be given peacetime indoctrination in the type of product he is to build in time of war. This is a continuing process which keeps industry abreast of the latest changes in military standards. This can best be achieved by pilot runs, not only with the prime contractors but also with their smaller feeder concerns.

2. *Standby Facility.* It is likewise essential that spare tool dies, test equipment, etc., be accessible so that available floor space can be utilized immediately.

3. *Order boards and contracts in the house.* It would be helpful if each manufacturer had his Mobilization Production Assignment in the form of completely negotiated contracts which become binding immediately war is declared.

4. *Accessible reserves of critical items and materials.* This requires ascertaining critical items prior to t_o and stockpiling if necessary.

5. *Standardization.* This should cover specifications, component parts, sub-assemblies, and selected end items, as well as contracting and inspection procedures.

6. *Plant dispersion.* This will reduce the hazard of the destruction of large segments of the industry by a single enemy assault.

These planning factors have been referred to as "second degree planning" on Fig. 3.

Reducing Lag

In the two previous examples we have taken measures which buy increases in the rate of production directly. It is also possible to buy time by lessening the period (T_1-T_o). (This, of course, indirectly buys additional production also.)

This lag is essentially time-required to create new facility and train new workers, so we must examine the appropriate planning factors.

1. *Education.* This involves the assembling and training of workers and may conceivably require more time than it takes to build new plant and facility. Steps should be taken to discourage the diffusion of trained and skilled workers to other industries.

2. *Plans for conversion* of industries not presently manufacturing electronics products worked out during peace-time.

3. *Contracts* for new structure, tools, and dies should be negotiated so as to become binding on the first day of hostilities.

4. *Accessibility to construction materials* in order to implement the plans for new facility should be considered before war strikes.

We will always be confronted with the problem of creating new facility. New plants cannot be constructed overnight; consequently, the lag (T_1-T_o) can never be completely eliminated. (Unless, of course, we are willing to build huge standby plants and place them in mothballs until the critical day.)

As this new facility is completed, it should start showing results at some time T_1. This increase continues until we have saturated the economy of this particular commodity. This rate will be fairly constant for any particular field. It is unforeseeable at this time how we can improve the slope of the curve between T_o and T_m. However, the sooner we arrive at T_1, the sooner we achieve maximum production at T_m. These methods show up as third degree factors in Fig. 3.

You will notice that we have been discussing the average value of production. Let us look at the excursions on either side of this mean value. The peaks indicate that the industry was actually capable of this production; however, at a short time later, something occurred to cause a slump. If we could minimize the valleys and at the same time maintain the peaks, the overall efficiency would be increased and a higher average value would be maintained. Removing the valleys means eliminating certain forms of frustration such as:

a. *Shortages* of critical materials, skilled labor, or component parts.

b. *Unnecessary modifications* and changes in the product specifications which do not necessarily reflect improvements which are commensurate to the production problems which are caused.

c. *The impact of revolutionary new weapons* which require special skills, tooling, and materials is inevitable. The necessary elasticity to accommodate these new weapons requires planning factors which have yet to be spelled out. This improvement shifts the entire curve vertically as shown and is referred to as fourth degree planning.

You will notice that during the initial critical period when we are strictly on the defensive, we are sadly lacking in production. It seems reasonable to conclude then that, if we cannot produce goods during this period, we had better have them on hand. This, of course, means balanced stockpiling. This stockpile can be drawn from as is needed. It therefore provides a means of reshaping the production curve to fit the demand more closely.

Fitting the Curves

Now let us compare the three degrees of production planning with the military demand curve. It is obvious that a reasonably good fit requires a balanced stockpiling program involving not only raw materials but component parts and selected end items. This stockpile can very readily result from the increased peacetime procurement FM. Operating stability was reached

(*Continued on page 84*)

Fig. 4: Curves showing combination of stockpiling and all-out planning

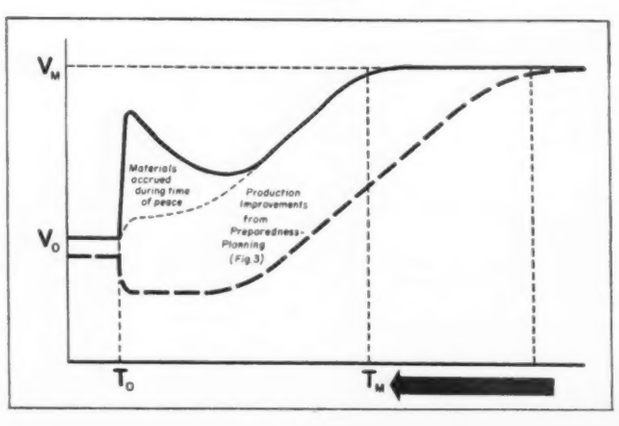
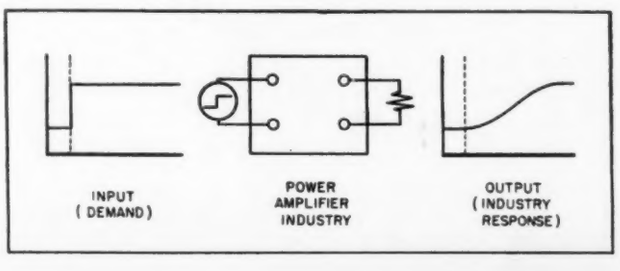


Fig. 5: Analogy of the industrial response to that of a power amplifier



LAST ROUNDS OF COLOR FIGHT

Final statements and exhibits made before FCC. Both RCA and CBS present fresh developments in effort to win favorable decision

Latest RCA contribution to the color TV art. With this tube, either one or three gun model, pictures in color or black and white, can be produced from the RCA dot sequential compatible system. Present tubes have 351,000 color dots, but finer resolution is expected from future mass-produced tube designs

THE cross-examination, which was left until the conclusion of the FCC hearing on color standards for television, has turned up some technical developments and viewpoints of interest to the communication engineer.

Oscillator Radiation—With closer grouping of TV sets this source of disturbance, evidenced by a beat pattern on the screen, may come from a neighbor's receiver. Early TV sets were bad offenders. Some manufacturers still brazenly disregard engineering design precautions which would reduce this evil. The FCC has now indicated that the manufacturers will have to do some policing or the Commission will take action regarding receivers that radiate more than the minimum field, the value of which is still to be determined. A figure of 15 μv./m at 100 ft. has been suggested.

Dr. Brown, witness for RCA, said that in a few months RCA will put into use a tuner which will meet this value on Channels 2-6 but not on the higher channels. In the UHF band oscillator radiation is worse because the chassis causes strong radiation. Tuners used in Bridgeport by RCA produced field strengths of 204 μv./m at 100 ft. and the converters, with a higher i-f, gave a figure of 56 μv./m. The witness did not think the plan to allocate TV stations so that the disturbing interference fell in an unused channel, was practical.

CBS Demonstrates Dot Interlace

To increase the horizontal resolution in the CBS system dot interlace was added experimentally over a closed circuit and demonstrated to the Commission. At the demonstration, CBS showed an all electronic color receiver for the first time. Considerably smaller than the mechanical disc receivers, it produced a brilliant picture on a standard RCA projection screen. The colors were, as usual in the CBS system, reproduced with great fidelity and when Patty Painter, the subject for the demonstration, entered the room after the showing there was no doubt that the colors seen on the screen were those she wore.

Although the effect of interlace on the CBS system was the point to be emphasized, in the minds of many observers the big screen bright projection picture was of greater import. It refuted the claims of many engineers that CBS suffered from the drawback of excessive flicker and color breakup if the screen brilliance is increased. In the demonstration it was impossible to produce any signs of color breakup by the usual expedients of waving fingers or bright objects in front of the beholders' eyes.

Three Color Tube

The projection set uses a 5-in. tube made by the Rauland Co. Three phosphors—red, green and blue—are deposited on the face and three pictures, one in each color, placed side by side across the tube. A triple lens focuses and combines the three pictures on the projection screen from the rear, following usual projection practice. At present only the green phosphor used in the all-electronic projection receiver has a long persistence characteristic and produces a picture on the projection tube having an intensity of approximately 560 foot-lamberts. When viewed directly, the absence of flicker at this intensity may be observed, and in contrast the flicker on the short persistence red and blue phosphors is quite apparent.

The majority of observers seemed to feel that there was litt'e difference between pictures with and without interlace, unless one spent the viewing time watching test patterns. On the latter the varying degrees of resolution naturally showed more conclusively, but on normal program material it was practically impossible to notice any difference. A point in favor of the CBS dot interlace system is its high frequency of 9 MC which should render it less susceptible to interference. Also coaxial cable transmission presents no problems since the 9 MC signal is not transmitted but is generated locally in the receiver and controlled by a sync pulse in a manner similar to the standard sync for picture synchronization.

For comparison with the projection receiver there were a standard 12½-in. disc receiver and another 12½-in. color receiver with the disc removed. In each of these receivers the magnifying lens had been removed. The projection receiver used refractive optics rather than the more usual reflective lens system. When the final demonstration in which a bandwidth of 9.6 MC was used to provide 525 lines as in present black-and-white television, very little difference appeared in the quality of the pictures — certainly not enough to warrant the increased bandwidth. The comparative tests covered the following:

a—4 MC video bandwidth as viewed on receivers installed in homes of members of the FCC and others during CBS January/February, 1950, tests.

b—4 MC video bandwidth employing horizontal interlace.

c—9.6 MC video bandwidth (equivalent to overall resolution of present black and white 525 line pictures).

At a private demonstration Ha-

J. Reeves (left) and Dr. Peter Goldmark demonstrating the new CBS color camera and control unit. The equipment shown is all that is required to put a color picture on the air, plus, of course, a transmitter. The unit on the right is a complete sync. generator and 12-inch color picture monitor. The camera, is remotely controlled and uses a standard image orthicon.

zeltine showed their versions of the CTI and RCA systems. The latter included at least two improvements: a method of removing the dot structure of the picture resulting from the RCA mode of sampling and a 6 db reduction in susceptibility of receivers to interference at the sampling frequency. Technical details have not yet been released by Hazeltine.

Following this demonstration, however, RCA may have supplied the answer by pointing out that the dot structure of their present picture was not inherent in the system. Some time ago they disclosed, but did not pursue to a developed stage, a method of removing the dots by means of low-pass filters between the receiver sampler and the picture tube. "Mixed highs" are fed to the picture tube *without* going through the sampler. This makes a more complicated receiver but it does remove the dot structure. Regarding the reduction of interference at the sampling frequency RCA indicated that the use of coils of higher Q would help.

NTSC Technical Standards

A proposal to turn to the new NTSC for technical standards came from Dr. Baker, vice-president of General Electric, who appeared as head of the RMA engineering division. He pointed out that our present satisfactory monochrome standards resulted from a reconciliation of d i v e r g e n t industry views achieved under the leadership of the old NTSC. The result was a system which bore no company name but combined the best points of many proposals. These standards were recommended to FCC, endorsed and made official. Dr. Baker recommended the same procedure be followed by the new NTSC. FCC should settle first the policy decisions such as specifying a comparible or a non-compatible system. It was thought that in about 10 months the NTSC would be able to recommend to the FCC for standardization a single set of color standards.

Pioneers in television who took part in forming the present standards, working with the old NTSC, know how valuable this recommendation would prove to the Commission and the millions of future users of color TV. Chairman Coy has not yet endorsed the NTSC.

Should the final decision on color standards by the FCC, made without the help of NTSC, result in in dual or multiple standards then the refusal of NTSC's offer, if there was such refusal, may mean large financial loss by many citizens who would buy the "wrong" system, for they will soon be obsolete. This will reflect on the TV industry. And again, if the RCA system be the only one selected, with FCC accepting the exact values now specified by RCA, it may be found by other television engineers, available through NTSC, that better or cheaper results can be obtained by specification modifications within the framework of the basic RCA system. Actually, only two other research laboratories in the USA, Hazeltine and Philco, are known to have in operation facilities for checking the newly-developed RCA standards. A field test of the complete system has been in operation only a short time in Washington with about a dozen receivers in homes. RCA researchers have done an excellent job on their color system but there *are* other brilliant minds in the TV field. The best plan would be to give them a chance to build and test apparatus producing the RCA type of picture in color. Collate their combined findings, as NTSC can; then determine the specifications for the best color system.

The most recent standards recommended are the same standards as for monochrome 525-line pictures where these apply; added are these standards for color: sampling frequency 3.583 MC; duty factor 15%; three colors in any specified sequence; the horz. sync pulse modified by a burst of 9 cycles of 3.583 MC. on the "back porch" occurring 2.5 secs. after the trailing edge of the horz. pulse; amplitude of this burst is .5 to .75 of the standard sync pulse. (See Fig. 1, Page 38, TELE-TECH, March, 1950.) "Mixed highs" are to be used; crossover at about 2 MC; color primaries as previously specified by RCA.

FCC has inquired into the patent position of parties to this hearing. Gen. Sarnoff was asked a series of questions on this subject, apparently to show that patent pools fostered monopoly. Some of the facts brought out were that there are 8,000-9,000 patents in RCA's pool, under which they will license any one for a royalty of about 2% of the manufacturer's selling price. Instead of buying "outside" patents RCA usually purchases a non-exclusive right, including the right to sub-license others. In granting others the right to use RCA's own patents, the right to sub-license is not granted. The patent agreement between Westinghouse, GE, Am. T. & T. and RCA expires Dec. 31, 1954.

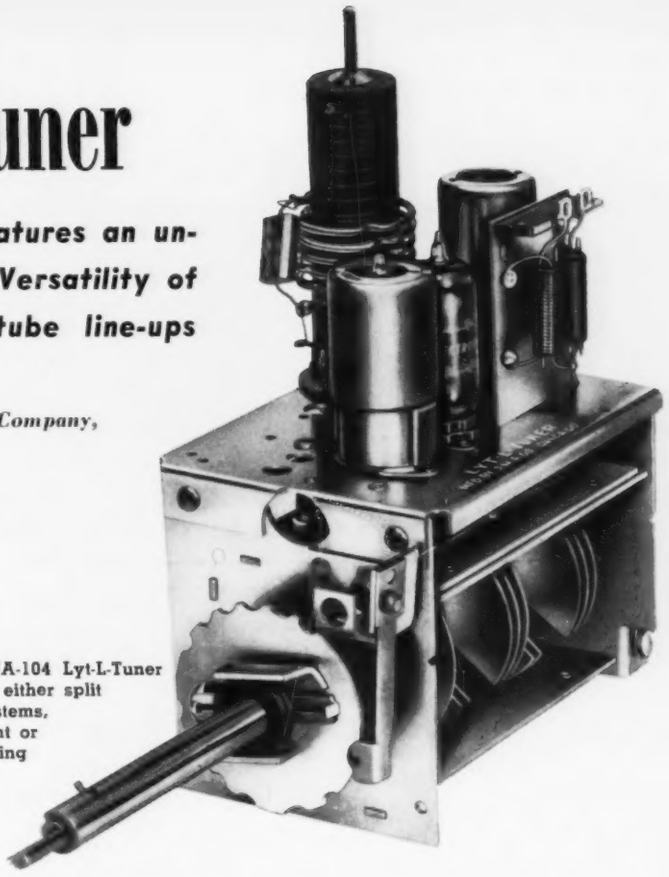
Next comes the freeze-removing allocation hearings. On June 5 the question of taking the 470-500 MC part of the UHF band from TV for common carrier use will come up. General allocations will be heard about July 1.

Because of the make up of our FCC it is possible that their decision will not be based entirely upon technical performance, both present and projected, so the final decision might be for dual or even multiple standards. Such a decision might be easier for the Commission but it would work a hardship on the public. The best plan now would be to hand this technical problem to the NTSC, after policy decisions have been made, request a speedy recommendation of standards—standards that the whole industry can support.

A New TV-FM Tuner

Continuously variable inductive tuner features an unusual rotor and stator tuning assembly. Versatility of overall design permits using various tube line-ups

By CHESTER W. LYTLE, President, S. M. A. Company, Chicago, Ill.



Overall view of TNA-104 Lyt-L-Tuner Design provides for either split or intercarrier i-f systems, as well as for detent or continuous type tuning

DURING the past several years many tuner designs have appeared on the market in answer to the growing demands of the television industry. While much of the demand was a result of increased receiver production, some of it was based on the realization that many of the earlier attempts at solving the tuner problem have not been successful due to unforeseen difficulties arising in the field. Increased congestion in the urban areas together with competitive attempts to extend satisfactory reception still further into the rural communities have demanded a standard of performance not anticipated even in some of the more recent tuner designs.

Current Tuners

In reviewing tuner types used in current television receivers, several distinct methods of overall tuner design and production are evident. Listed in two groups these include:

1. *Separate tuning circuits for each channel with mechanical selection*
   (a) Separate preset tuning circuits for each channel.
   (b) Turret tuners with individual coil positioning near the high frequency tubes.
2. *Fixed circuit elements with step or continuously variable tuning*
   (a) Fixed inductance with capacitance tuning.
   (b) Permeability tuning with iron cores.
   (c) Variable inductance by sliding contact methods.
   (d) Variable inductance by shorted turn effect.

Group 1 offers the advantages of compactness, uniform indexing, possibility of separate engineering for each channel. Handicaps include problems offered by numerous switching contacts and numerous inductance-capacitance adjustments.

The types indicated in Group 2, with the exception of permeability tuning, are mechanically simple and have reduced costs in tuned circuitry. Common disadvantages are circuit variations from sliding contacts, non-uniformity of core material, non-uniformity of distributed inductance and capacitance, backlash in mechanical ganging devices and precision requirements in component manufacture and circuit alignment.

Problems of a geometrical nature, overall complexity of design and production are of course encountered to a varying degree in all tuner types.

Design Objectives

A consideration of possible tuning methods, over recent years, in terms of assuring higher sensitivity levels, improved geometric and mechanical design, and production simplicity indicated that variable inductance by means of the shorted turn effect offered a most promising field for tuner development.

This, coupled with the serious need that existed for a more simple and efficient TV tuner, has led to the present design whose functional objectives included:

(a) The tuner should yield a composite of the advantages of current types with a minimum of the disadvantages of these types.
(b) System complexity should be increased.
(c) Mechanical and electrical versatility should be improved with stress on optional tube lineups.
(d) Production tooling procedures should be simplified and standardized as much as possible.
(e) Reliability and accuracy should be emphasized.
(f) Ease of service should be achieved, particularly through the indirect benefits of a, b, d and e.
(g) Flexibility for possible TV channel additions.

The technical objectives included:

(a) The reduction of signal circuit switching to a minimum.
(b) Elimination or minimizing of undesired electrical variants.
(c) Circuit simplicity.
(d) Reduction of noise to minimum levels.
(e) Elimination of complexity in connecting leads, excessive precision parts and components.
(f) Inexpensive components with constant characteristics in mass production and assembly.
(g) Improved serviceability.

This tuner is an inductive type tuner with only a few switch contacts. These are used only to switch from low to high band by automatic

TV-FM TUNER (Continued)

means during full tuning coverage.

The tuner can be operated in either of two fundamental ways:

1) Continuous tuning covering all television channels in 360° or coverage of the TV channels and FM band in 540° rotation.
2) Mechanical channel indexing with associated fine tuning.

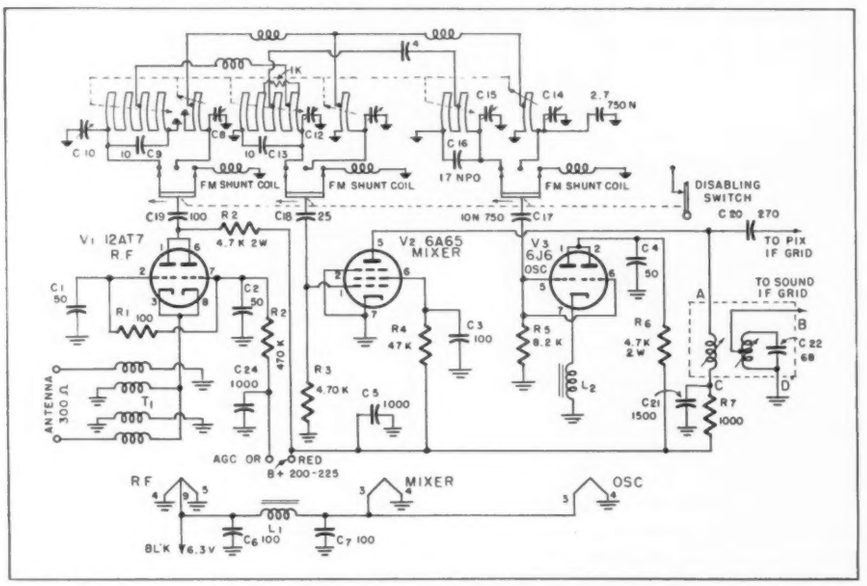
The fine tuning control for both systems is concentric with the main tuner shaft and drives the main shaft through a speed reduction mechanism. Since the fine tuning control thus simultaneously adjusts all circuits, perfect tracking can be maintained.

Superior performance is achieved through the use of a 12AT7 r-f amplifier, 6J6 oscillator and 6AG5 mixer although the basic unit is usable in designs involving other tube complements. Other complements are possible because the circuit chassis is removable and is easily tooled for other tube lineups.

The dual section 12AT7 grounded grid r-f amplifier is operated with both sections in parallel. The r-f amplifier input is matched to the antenna through a 300 ohm balanced impedance with the resulting advantage of marked attenuation of the unbalanced signal. Both of these features make a very marked reduction in the amount of oscillator voltage appearing on the antenna as compared to conventional designs.

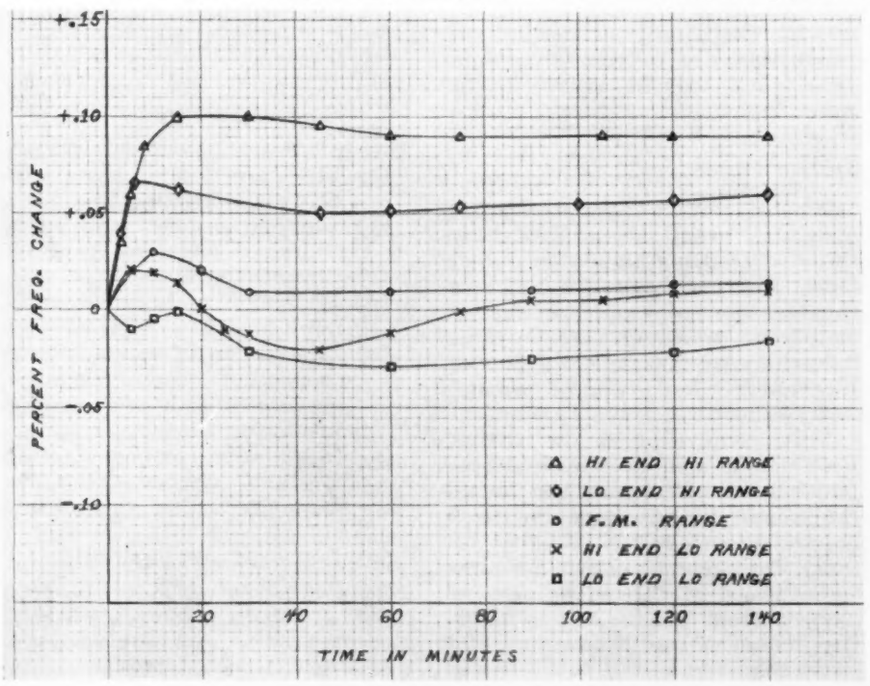
Provision is made for applying AGC voltage to the grid through an isolating resistor with the grid at r-f ground through low inductance capacitors formed by discs riveted to the chassis.

The plate of the r-f amplifier is coupled to the grid of the first detector by means of a double tuned band pass circuit. Frequency conversion is obtained by the use of a 6AG5 with injection to the signal grid by means of capacitative coupling to the oscillator stage on low band and inductive coupling on the high band.



Schematic diagram of tuner using 12AT7 r-f amplifier, 6AG5 mixer, and 6J6 oscillator

Curves showing oscillator stability during warm-up and over an extended operating period



Colpitts Oscillator

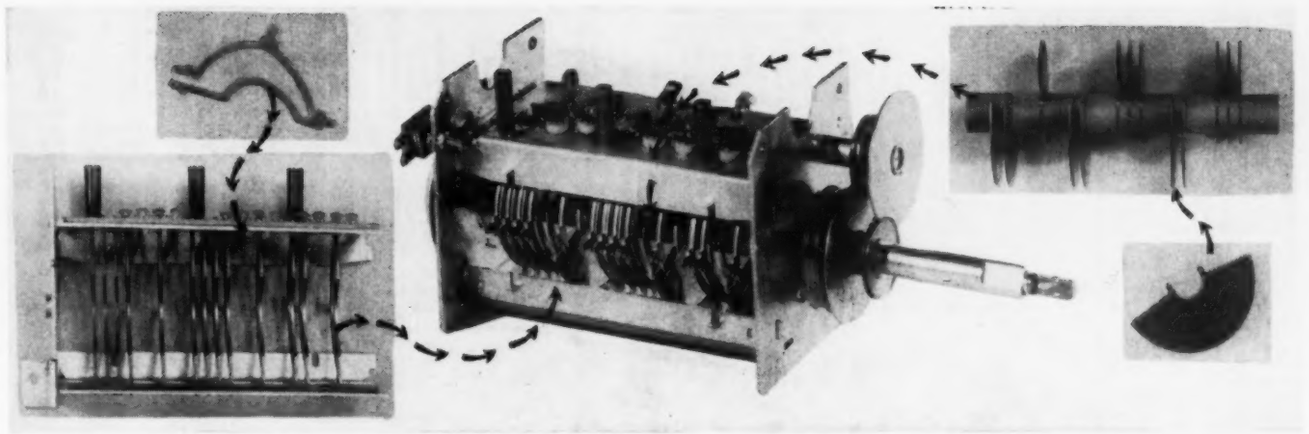
A modified Colpitts oscillator circuit employing a 6J6 is used. The oscillator is designed with stability and output voltage characteristics so as to maintain ample injection for exceilent operation on reduced line voltages. The oscillator tube may be replaced without re-alignment of the tuner.

The r-f band-pass curve and oscillator tracking are such that the video carrier is always just inside the low frequency peak. Peak to valley ratios as well as high to low peak ratios in no case exceed 3 db. Maximum bandwidth is 10 MC for any channel. Design parameters are such as to permit an easy change to higher intermediate frequencies, although the tuner is normally supplied for the usual 21-25 MC, i-f.

The tuner is designed for either single output such as is used in intercarrier i-f systems or separate outputs for separate sound and picture i-f systems.

Tuning is accomplished by a series of copper plates whose appearance and mechanical function are similar to that of the rotor of a conventional gang condenser but whose electrical function is that of a highly conductive shorted turn. Each individual copper plate is gradually brought in proximity to the corresponding stamped copper stator thereby reducing its inductance at a pre-determined rate.

Two complete sets of plates and coils are used; one set for the high frequency TV band and one set for

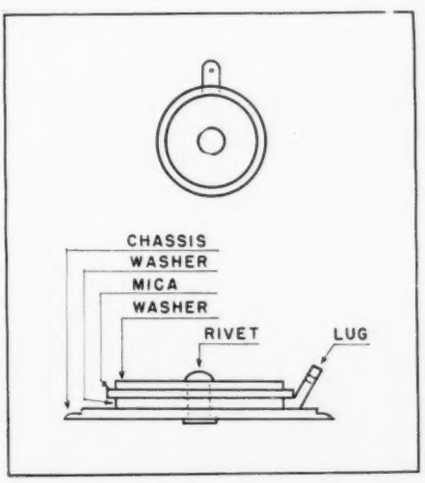


Detailed view of tuner showing construction and location of stator coil and rotor plate elements. Unit illustrated is continuous tuning type

the low frequency TV band.

Switching between the two bands is accomplished automatically by a slide switch ganged to the tuning shaft. Models incorporating the FM band utilize the low frequency TV tuning elements by means of shunt coils automatically switched in parallel with them.

In several models, a mechanical friction disc type vernier tuning control is concentric with the main dial shaft and reduces the drive rate



Button capacitors, formed by riveting elements directly to the chassis, are used as an inexpensive type high frequency by-pass

of the main dial shaft over the entire tuning limits by a 6:1 ratio. In models having mechanical channel detents, the fine tuning control turns the main shaft both sides of its average position for each channel by means of a cam. The amount of this variation can be easily changed by the selection of the cam throw associated with the index unit.

The overall size ($6\frac{3}{8}$" x $3\frac{3}{8}$" x $3\frac{1}{4}$") enables the unit to fit into the space occupied by other types of tuning assemblies and affords very flexible mounting arrangements. It may be mounted directly to chassis without the use of shock mounts.

Performance

Tests were conducted on various commercial tuners to obtain comparative data on noise and gain. Tuners produced by the eight leading manufacturers and the Lyt-L-Tuner were tested under the same measuring conditions. Channel 13 was selected for this check as it is the highest frequency channel and imposes the most severe test conditions with regard to factors affecting noise and gain levels. Comparison of the noise and gain figures of the Lyt-L-Tuner to the average figures for the other eight showed the Lyt-L-Tuner to have approximately 20% more gain and to have 40% less noise.

The following data was obtained with a TNA-102 tuner operating in a typical high quality TV chassis:

	Channel	Average	Channel	Average
Noise factor	2-6	9 db	7-13	10 db
Image Response	2-6	40 db	7-13	40 db
IF rejection	2-6	60 db	7-13	60 db
Gain*	2-6	29 ± 3 db (300 ohm input)	7-13	29 ± 3 db
		35 ± 3 db (100 ohm input)		35 ± 3 db
SWR	2-6	1.8:1	7-13	1.6:1

* Measurements taken from the input to the grid of the first video IF with (22.0 mc) amplifier tube grid resistor of 10K ohms.

The relatively low noise level is secured by the use of a grounded grid triode instead of the usual grounded cathode amplifier. Although this procedure sacrifices a small amount of gain in the tuner, it is desirable in the interest of obtaining the lowest possible noise ratio for a given amount of gain; i.e., the best "Figure of Merit" of performance. Any loss in gain can, in most instances, be recovered in the IF system.

The gain over all channels is constant within extremely narrow limits. The preceding table shows a flat gain figure from channel 2 to 13 for both 100 ohm and 300 ohm r-f input impedances. This is of obvious importance in assuring uniform reception on all channels without undue alignment attention or signal boosting. The uniformity in gain, moreover, is of especial value to those areas having channels concentrated in the low or high bands since specific peaking according to geographical area will be minimized.

The oscillator stability and temperature compensation tests demonstrated excellent characteristics over all portions of the TV and FM bands during test measurements extending over a period of several hours. The slight deviations noted during the test period were similar in the various test channels of the TV and FM bands which highlights the uniformity of circuit characteristics in both high and low channels. Measurement points were selected at four points of the TV band and one point in the FM band, namely Low End-Low Range, High End-Low Range, Low End-High Range, High End-High Range and

(*Continued on page* 86)

Typical dial plates for the detent type tuner (left) and continuous type tuner (right)

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TV STATION DATA

Stations on the air; CP holders; Personnel; Addresses; Equipment Specs

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State	City	Call Letters	Network-Facility	Channel	Video ERP (KW)	Audio ERP (KW)	Ant. Ht. Above Av. Terrain (Ft.)	Trans. Address	Studio Address	Company Address	No. Studio Cameras	No. Field Cameras	Micro Wave Relay MC'S	35 MM Projectors	16 MM Projectors	2 by 2 Slide Projectors	3¼ by 4 Slide Projectors	Sets in Area (Thousands)	Population Served 0.5 MV Contour (Thousands)	Chief Engineer	Manager
ALA.,	Birmingham	WAFM-TV	AC K	13	26	13	875	Red Mountain	Protective Life Building	Protective Life Building	2	2	—	—	1	1	1	15	—	J. L. Evans	Thadholt, Pr.
		WBRC-TV	DN K	4	15	7.25	530	Red Mountain	1727½ 2nd Avenue N.,	1727½ 2nd Avenue, N.	4	–	—	—	4	1	1	13	440	G. P. Hamann	G. P. Hamann
ARIZ.,	Phoenix	KPHO-TV	ACDN K	5	17.4	8.7	482	Westward Ho Hotel	631 N. 1st Avenue	631 N. 1st Avenue	–	–	—	—	—	—	—	—	—	W. J. Stiles	Care Wester
CALIF.,	Los Angeles	KECA-TV	A K	7	29.5	14.8	2900	Mt. Wilson	4151 Prospect St.	4151 Prospect Street	11	6	7,000-7,025	2	2	4	2	550	4,000	P. G. Caldwell	Clyde Scott
		KFI-TV	K	9	31.4	15.7	3100	Mt. Wilson	141 N. Vermont Avenue	141 N. Vermont Avenue	2	2	7,000	–	1	1	1	496	3,219	H. L. Blatterman	W. B. Ryan
		KLAC-TV	K	13	31.4	15.75	3100	Mt. Wilson	1000 Cauhuenga Blvd.	1000 Cauhuenga Boulevard	8	8	6,900	–	–	–	–	531	—	R. W. Conner	Don Fedderson, V.P.
		KNBH	N K	4	15	8	3018	Mt. Wilson	Sunset & Vine Streets	Sunset & Vine Streets	6	2	7,000	2	2	4	–	600	4,500	R. W. Clark	H. J. Bock
		KTLA	K	5	30	15	2920	Mt. Wilson	5451 Marathon Street	5451 Marathon Street	4	4	7,000	2	2	2	2	531	5,092	R. Moore	K. Landsberg
		KTSL	D K	2			1700	Mt. Wilson	1313 No. Vine Street	1313 N. Vine Street	6	6	7,000	–	1	1	–	531	3,999	H. W. Jury	L. A. Weiss
		KTTV	C K	11	31.5	16.6	2345	Mt. Wilson	1025 N. Highland	1025 N. Highland	6	4	7,062 6,887	1	2	3	1	500	5,092	R. A. Monfort	H. M. Dunham
	San Diego	KFMB-TV	ACN K	8	20	20.2	712	Mt. Soledad	Hotel San Diego	1375 Pacific Highway	2	2	7,000-7,025	–	1	1	1	36	400	Thornton Chew	J. O. Gross
	San Francisco	KGO-TV	A K	7	25.4	12.6	1260	ABC Tv. Center	ABC TV. Center	ABC TV. Center	3	3	—	1	1	–	1	55	2,000	A. E. Evans	G. V. Grubb
		KPIX	CD K	5	29.9	15.6	538	Mark Hopkins Hotel	Mark Hopkins Hotel	Mark Hopkins Hotel	3	3	7,000	–	1	1	1	55	1,500	A. E. Towne	P. G. Lasky
		KRON-TV	N K	4	15	7.5	1480	San Bruno Mountain	5th & Mission Streets	901 Mission	4	4	—	–	1	1	1	50	1,585	R. A. Isberg	CharlesTtuerist
CONN.,	New Haven	WNHC-TV	ACDN I	6	1.82	9.57	500	Gaylord Mountain	1110 Chapel Street	1110 Chapel Street	2	2	7,000	–	2	1	–	34	180	V. deLaurentis	James Milne
DEL.,	Wilmington	WDEL-TV	ND I	7	1	0.5	336	10th & King Streets	10th & King Streets	10th & King Streets	2	–	—	–	1	1	1	45	—	J. E. Mathiot	J. G. Walsh
D. C.,	Washington	WMAL-TV	A I	7	22	12	515	American University	1625 "K" Street, N.W.	1625 "K" Street, N.W.	2	2	7,000 2,000	–	2	2	–	—	—	F. W. Harvey	K. H. Berkeley
		WNBW	N I	4	20.5	10.5	330	Wardman Park Hotel	Wardman Park Hotel	724 14th Street	–	5	6,962.5 6,937.5	2	1	2	–	110	1,400	D. N. Cooper	W. R. McAndrew
		WOIC	C I	9	27.3	14.4	621	40th & Brandywine, N.W.	40th & Brandywine, N.W.	40th & Brandywine, N.W.	8	8	—	–	1	1	1	119	1,214	R. D. Compton	E. S. Thomas
		WTTG	D I	5	17.5	10.5	587	Arlington, Va.	12th & "E" Streets, N.W.	12 & "E" Streets, N.W.	2	3	6,975-2,025	–	2	2	–	123	1,052	M. M. Burleson	Walter Compton
FLA.,	Jacksonville CP	WJAX-TV						In hearing for renewal of CP													
		WMBR-TV	ACDN K	4	14.8	7.8	438	Ft. of Vine Street	625 S. Main Street	P. O. Box 5187	2	2	2,076	–	–	–	–	10	380	E. B. Vordermark	F. M. King
	Miami	WTVJ-TV	CDN K	–	2.2	1.1	306	Everglades Hotel	17 N.W. 3rd Street	17 N.W. 3rd Street	5	3	7,890	–	–	–	–	25	600	Earl Lewis	Lee Ruwitch
GA.,	Atlanta	WAGA-TV	CD K	5	18	9.5	550	1018 W. Peachtree St., N.W.	1032 W. Peachtree St., N.W.	1032 W. Peachtree Street	2	2	6,987.5	–	1	1	1	40	—	P. B. Cram	J. E. Bailey
	CP	WCON-TV	K	2	4.9	2.5	1000	11 Forsyth Street, S.W.	11 Forsyth Street, S.W.	11 Forsyth Street, S.W.	2	–	—	–	2	1	1	—	—	H. J. Aderhold	Davied Carpenter
		WSB-TV	AN K	8	23.8	12.5	546	1601 Peachtree Street	1601 Peachtree Street	Biltmore Hotel	2	2	7,000	–	2	3	–	40	822	C. F. Daugherty	J. M. Outler, Jr.
ILL.,	Chicago	WBKB	C I	4	11	7.5	650	33 N. LaSalle Street	190 N. State Street	190 N. State Street	6	8	6,950	2	2	1	1	458	4,517	W. P. Kusack	J. M. Mitchell
		WENR-TV	A I	7	25	15	668	20 N. Wacker Drive	20 N. Wacker Drive	20 N. Wacker Drive	9	3	7,000	2	2	2	1	500	6,000	E. C. Horstman	Roy McLaughlin
		WGN-TV	D I	9	11.2	7.3	586	435 N. Michigan Avenue	441 N. Michigan Avenue	441 N. Michigan Avenue	10	9	7,025 6,875	2	2	1	1	458	4,895	C. J. Meyers	F. P. Schreiber
		WNBQ	N I	5	21.8	11.8	625	20 N. Wacker Drive	Merchandise Mart	Merchandise Mart Plaza	8	3	6,987.5	2	2	1	–	458	5,392	H. C. Luttgens	I. E. Showerman, V.P.
	Rock Island	WHBF-TV	ACD K	4	13.6	7.6	350	18th Street, 3rd Avenue	18th Street, 3rd Avenue	Safety Building	2	2	—	–	1	1	1	10	275	R. J. Sinnett	L. C. Johnson
IND.,	Bloomington	WTTV	ACDN I	10	0.5	1	150	535 S. Walnut Stfeet	535 S. Walnut Street	535 S. Walnut Street	2	2	7,000	–	1	1	–	6	—	M. L. Weigel	Glenn Van Horn
	Indianapolis	WFBM-TV	ACDN K	6	28.2	18.1	464	Merchants Bank Building	48 Monument Circle	48 Monument Circle	4	4	—	–	2	1	–	40	—	H. S. Holland	Harry Bittner
IOWA	Ames	WOI-TV	ACDN K	4	13	8	–	Ames	Ames	Ames	–	–	—	–	–	–	–	9	—	L. L. Lewis	R. B. Hull
	Davenport	WOC-TV	N K	5	22.9	12.5	350	RRI—Bettendorf	805 Brady Street	805 Brady Street	2	2	6,975 & 7,000	–	1	1	–	15	300	P. G. Arvidson	E. C. Sanders
KY.,	Louisville	WAVE-TV	ADN K	5	7	5	510	334 E. Broadway	334 E. Broadway	334 E. Broadway	4	4	6,975	–	1	1	1	30	596	W. E. Hudson	Nathan Lord
		WHAS-TV	C K	9	9.6	7.2	529	6th & Broadway	6th & Broadway	6th & Broadway	2	2	7,025	–	2	–	1	30	697	O. W. Towner	V. A. Sholis, Dir.
LA.,	New Orleans	WDSU-TV	ACDN K	6	31	15	395	520 Royal Street	520 Royal Street	520 Royal Street	3	3	31,800	–	1	1	–	25	700	L. G. Riddle	Robert Swezby
MD.,	Baltimore	WAAM	AD I	13	26.1	14	530	3725 Malden Avenue	3725 Malden Avenue	3725 Malden Avenue	–	4	—	–	2	2	–	—	1,437	G. H. Lahman	
		WBAL-TV	N I	11	27.2	13.1	540	2401 Violet Avenue	2610 N. Charles	2610 N. Charles	6	2	6,912.5 6,887	–	3	4	–	158	2,530	W. C. Barcham	Harold Burke
		WMAR-TV	C I	2	16	9	591	Mathieson Building	Baltimore & Charles	Baltimore & Charles	2	5	6,925	–	2	1	–	169	—	C. G. Nopper	E. K. Jett, V.P. & Dir.
MASS.,	Boston	WBZ-TV	N I	4	15.61	7.13	543	1170 Soldiers Field Road	1170 Soldiers Field Road	1170 Soldiers Field Road	2	2	7,000	1	1	1	–	339	250	W. H. Hauser	W. C. Sawtlley
		WNAC-TV	DAC I	7	26.6	13.3	501	Murray Street, Molden	21 Brookline Avenue	21 Brookline Avenue	5	3	6,937.5	2	2	1	1	358	2,810	I. B. Robinson	H. L. Travers
MICH.,	Detroit	WJBK-TV	CD I	2	16.5	8.3	450	Lyndon & Cloverdale	500 Temple	500 Temple	2	2	7,000	–	1	1	–	203	2,382	P. O. Frincke	R. E. Jones
		WXYZ-TV	A I	7	27.9	13.9	485	McCabees Building	McCabees Building	McCabees Building	6	2	7,000-7,025	1	1	1	–	216	—	C. .F Kocher	J. G. Riddell
		WWJ-TV	N I	4	17.5	8	588	Penobscot Building	622 W. Lafayette	622 W. Lafayette	7	4	2,000	–	2	3	1	212	3,000	E. J. Love	Harry Bannister
	Grand Rapids	WLAV-TV	ACDN I	7	20	10	501	6 Fountain Street, N.E.	6 Fountain Street, N.E.	6 Fountain Street, N.E.	–	–	—	–	1	1	1	30	990	L. G. Stevens	H. M. Steed

now Testing	Kalamazoo	WKZO-TV	CD	I	3	16	8	525	Plainwell	124 W. Michigan Avenue	124 W. Michigan Avenue	–	–	—	–	2	1	–	50	943	C. E. Lee	J. E. Fetzer
	Lansing	WJIM-TV	NACD	I	6	19.6	9.3	345	Lansing Township	Bank of Lansing Building	Bank of Lansing Building	–	–	2,025-2,042	–	2	1	–	17	1,000	Cy Castle	H. F. Gross
MINN.,	Minneapolis-St. Paul	KSTP-TV	N	K	5	24.7	17.3	560	3415 University Avenue	3415 University Avenue	3415 University Avenue	6	5	6,987.5	–	2	2	–	87	1,042	J. J. McMahon	S. E. Hubbard
		WTCN-TV	ACD	K	4	18	9.2	496	Foshay Tower	Radio City	50 S. 9th Street	4	3	6,962.5	4	1	2	–	87	1,200	J. M. Sherman	E. Van Konynenburg
MO.,	Kansas City	WDAF-TV	ACDN	K	4	22	11	775	3030 Summitt Street	3030 Summitt Street	3030 Summitt Street	2	2	6,962.5	–	1	1	–	35	1,130	J. A. Flaherty	Dean Fitzer
	St. Louis	KSD-TV	ACDN	I	5	16	18	524	1111 Olive Street	1111 Olive Street	1111 Olive Street	2	2	7,000-7,025	–	1	1	1	125	1,271	J. E. Risk	G. M. Burbach
NEBR.,	Omaha	KMTV	ACD	K	3	16.7	8.4	591	2615 Farnam Street	2615 Farnam Street	2615 Farnam Street	2	2	—	–	2	3	–	23	409	R. J. Schroeder	Owen Saddler
		WOW-TV	N	K	6	16.2	8.5	590	3509 Farnam Street	3509 Farnam Street	3509 Farnam Street	2	–	(2)-7,000 (1)-2,000	–	2	2	1	25	425	W. J. Kotera	J. J. Gillin, Jr., Pr.
N. J.,	Newark	WATV		I	13	50	25	800	W. Orange	Television Center	1020 Broad Street	6	–	7,000	–	2	–	2	1,125	—	F. V. Bremer	Irving Rosenhaus
N. MEX.,	Albuquerque	KOB-TV	ACDN	K	4	5	2.5	440	905 S. Buena Vista	234 S. Fifth Street	234 S. Fifth Avenue	2	2	6,900	–	1	1	1	3	150	G. S. Johnston	P. Hoffman
N. Y.,	Binghamton	WNBF-TV	ACDN	K	12	12	11.7	850	Ingraham Hill Road	Arlington Hotel	Arlington Hotel	2	–	—	–	2	1	–	13	395	Stantz	C. D. Mastin
	Buffalo	WBEN-TV	ACDN	I	4	16.2	10.2	335	Hotel Statler	Hotel Statler	Hotel Statler	2	2	6,950-6,975	0	2	2	0	90	975	R. J. Kingsley	C. R. Thompson
	New York	WABD	D	I	5	14.25	9.45	650	515 Madison Avenue	770 Broadway 515 Madison Avenue 152 W. 54th Street	515 Madison Avenue	17	3	7,000	2	3	1	–	1,270	11,310	Rodney Chipp	M. Lowei
		WCBS-TV	C	I	2	13.7	10	900	Chrysler Building	15 Vanderbilt Avenue	485 Madison Avenue	9	25	(3)-7,000	3	5	–	3	1,250	11,446	P. F. Wittlig	Richard Swift
		WJZ-TV	A	I	7	3.8	1.8	1255	Empire State Building	7 W. 66th Street	7 W. 66th Street	–	6	—	2	2	1	1	1,250	12,000	W. H. Trevarthen	M. B. Grabbhorn, V.P.
		WNBT	N	I	4	7.0	5.75	1280	Empire State Building	30 Rockefeller Plaza	30 Rockefeller Plaza	30	9	7,000-2,000	4	4	4	–	1,300	—	R. E. Shelby	Thomas McFadden
		WOR-TV		I	9	9.0	11.0	975	N. Bergen, N. J.	20 W. 67th Street	1440 Broadway	10	11	7,025-7,050	2	4	1	1	1,400	11,545	J. R. Poppele	T. C. Streibert
		WPIX		I	11	18.5	9.25	733	220 E. 42nd Street	220 E. 42nd Street	220 E. 42nd Street	5	6	7,000	2	2	3	–	—	11,411	T. E. Howard	G. B. Larsen
	Rochester	WHAM-TV	ACDN	I	6	16.7	8.65	497	201 Humboldt Street	201 Humboldt Street	Rochester Radio City	2	2	7,000	–	1	–	1	40	623	K. J. Gardner	Wm. Fay
	Schenectady	WRGB	ACDN	I	4	16.32	8.16	776	New Scotland	60 Washington Avenue	60 Washington Avenue	5	2	(1)-2,000 (1)-7,000	2	2	1	1	78	256	W. J. Purcell	B. J. Rowan
	Syracuse	WHEN	ACD	I	8	8.25	5.75	380	101 Court Street	101 Court Street	101 Court Street	3	2	7,000	–	2	2	–	45	603	H. E. Crow	Paul Adanti
		WSYR-TV	N	I	5	23.5	12.8	640	Sentinel Heights	224 Harrison Street	224 Harrison Street	–	–	—	–	1	1	–	39	850	A. G. Belle Isle	H. C. Wilder
	Utica	WKTV	ACDN	I	13	13	11.3	830	Smith Hill Road	Smith Hill Road	Smith Hill Road	1	–	—	–	1	1	1	13	850	D. T. Layton, Jr.	M. C. Fusco
N. CARO.,	Charlotte	WBTV	ACDN	K	3	16.3	8.2	1135	Spencer Mountain	Spencer Mountain	Wilder Building	2	0	—	–	2	1	–	15	841	M. J. Minor	C. H. Crutchfield
	Greensboro	WFMY-TV	ACDN	K	2	16.70	840	470	212 N. Davie Street	212 N. Davie Street	212 No. Davie Street	1	0	—	–	1	1	–	11	250	W. E. Neill	Gaines Kelley
OHIO,	Cincinnati	WCPO-TV	AD	I	7	21	12	695	2345 Symmes Street	2345 Symmes Street	2345 Symmes Street	2	2	6,875-(2)	–	2	2	1	100+	1,417	G. E. Markinson	M. C. Watters
		WKRC-TV	C	I	11	24.5	12.3	650	Highland Avenue	800 Broadway	Hotel Alms	2	2	6,875	–	1	1	1	120	1,540	G. A. Wilson	Hulbert Taft, Jr.
		WLW-T	N	I	4	—	—	—	2222 Chickasaw Street	2222 Chickasaw Street	2222 Chickasaw Street	2	3	7,000	–	2	3	–	110	1,033	C. A. Bopp	J. T. Murphy
	Cleveland	WEWS	AC	I	5	16.3	8.15	640	7080 State Road, Parma	1816 E. 13th Street	1816 E. 13th Street	3	3	7,000	–	1	1	–	200	1,451	J. B. Epperson	J. C. Hanrahan
		WNBK	N	I	4	31.1	19.8	620	Brecksville	815 Superior	815 Superior	4	5	6,962.5 6,912.5	2	2	2	–	200	2,331	S. E. Leonard	John McCormick
		WXEL	AD	I	9	21	13	437	Pleasant Valley & State Rd.	Pleasant Valley & State Rd.	Pleasant Valley & State Road	2	3	—	–	2	2	1	200	2,300	Thomas Friedman	Franklin Snyder
	Columbus	WBNS-TV	C	I	10	28.4	14.2	485	495 Olentangy Boulevard	495 Olentangy Boulevard	33 N. High Street	3	2	7,025-7,050	–	1	1	1	50	900	L. H. Nafzger	E. A. Borel
		WLW-C	N	I	3	15.2	—	455	3165 Olentangy River Road	3165 Olentangy River Road	3615 Olentangy River Road	2	2	7,000	–	2	1	–	57	585	C. B. Sloan	James Leonard
		WTVN	AD	I	6	6.23	3.4	545	Lincoln Tower	Lincoln Tower	Lincoln Tower	2	1	—	–	1	1	–	64	—	J. M. Burke	John Rossiter
	Dayton	WHIO-TV	ACD	I	13	24	12	570	1414 Wilmington Avenue	45 S. Ludlow Street	1414 Wilmington Avenue	–	2	—	–	1	1	–	62	1,300	E. L. Adams	R. H. Moody
		WLW-D	N	I	5	16	8	490	Frytown & W. Carrolton Rds.	4595 S. Dixie Highway	4595 S. Dixie Highway	2	2	6,875-6,975	–	2	4	–	62	1,232	H. Lepple	H. P. Lasker
	Toledo	WSPD-TV	ACDN	I	13	25	12.3	524	25 Superior Street	136 Huron Street	136 Huron Street	2	2	—	–	1	1	–	39	1,500	Wm. Stringfellow	E. Y. Flannigan
OKLA.,	Oklahoma City	WKY-TV	ACDN	K	4	12.2	3.1	943	Britton	Little Theater	Skirvin Tower Hotel	3	2	6,950	–	1	1	–	27	423	H. J. Lovell	P. A. Sugg
	Tulsa	KOTV	ACDN	K	6	6.6	8.3	480	National Bank of Tulsa	302 S. Frankfort Avenue	302 S. Frankfort Avenue	2	2	6,985	–	2	2	–	24	316	Geo. Jacobs	M. H. Alvarez
PA.,	Erie	WICU	ACDN	I	12	2	1.5	229	3515 State Street	3515 State Street	35th & State	1	–	—	–	1	1	–	35	—	James Burke	R. S. Underhill
	Johnstown	WJAC-TV	ACDN	IK	13	6.5	3.7	1120	Laurel Hill Mountain	329 Main Street	329 Main Street	–	–	—	–	2	1	1	21	750	N. L. Straub	Alvin Schrott
	Lancaster	WGAL-TV	ACDN	I	4	1	0.5	650	4-10 W. King Street	4-10 W. King Street	4-10 W. King Street	–	–	—	–	–	–	–	–	—	J. E. Mathiot	H. A. Miller
	Philadelphia	WCAU-TV	C	I	10	25	14	667	12 S. 12th Street	1622 Chestnut Street	1622 Chestnut Street	9	9	(3)-7,000	–	1	1	–	456	3,682	J. G. Leitch	D. T. Thornburgh
		WFIL-TV	AD	I	6	27	13.4	645	Culp Street	46th & Market Streets	Widener Building	5	3	7,000	–	2	1	–	428	4,207	L. E. Littlejohn	R. W. Clipp
		WPTZ	N	I	3	16.2	8.1	719	1800 E. Mermaid Avenue, Wyndmoor, Pa.	1619 Walnut Street	1619 Walnut Street	4	6	6,875-6,950	2	2	–	–	495	3,307	R. J. Bowley	E. B. Loveman, V.P.
	Pittsburgh	WDTV	ACDN	I	3	16.6	8.3	835	4100 Grizella Street	4100 Grizella Street	4104 Grizella Street	–	–	—	–	2	–	–	—	—	R. W. Rodgers	D. A. Stewart
R. I.,	Providence	WJAR-TV	CN	I	11	30	15	615	Rehoboth	176 Weybosset Street	176 Weybosset Street	2	2	7,000	–	2	2	–	40	—	T. C. Prior	J. J. Boyle
TENN.,	Memphis	WMCT	ACDN	I	4	13	7	650	Thomas Road	Third at Madison	P. O. Box 311	2	2	7,000	–	2	2	–	35	578	E. C. Frase, Jr.	H. W. Slavick
	Nashville CP	WSM-TV	CN	K	4	14.4	7.2	700			301 7th Avenue, N.	–	–	—	–	–	–	–	—	—	G. A. Reynolds	H. L. Stone
TEXAS,	Dallas	KRLD-TV	C	K	4	15.8	8.0	481	Herald Square	Herald Square	Herald Square	4	2	2,000	–	1	1	–	50	1,000	R. M. Flynn	C. W. Rembert
		WFAA-TV	ND	K	8	27.8	13.5	377	3000 Hines Boulevard	3000 Hines Boulevard	3000 Hines Boulevard	2	2	2,042-2,059	–	2	2	1	49	—	M. C. Barton	S. C. Sanford
	Fort Worth	WBAP-TV	AN	K	5	16.4	8.2	490	3900 Barnett Street	3900 Barnett Street	3900 Barnett Street	3	2	6,875-6,975	–	1	1	–	53	1,000	R. C. Stinson	Geo. Cranston
	Houston	KLEE-TV	ACDN	K	2	15.1	7.54	502	Post Oak Road	Milby Hotel	Milby Hotel	4	2	6,925-6,950	–	2	3	–	21	571	Paul Huhndorff	S. Balkin
	San Antonio	KEYL	D	K	5	19.6	9.5	420	Transit Tower Building	Transit Tower Building	Transit Tower Building	2	2	—	–	1	1	–	15	400	W. R. Sloat	W. B. Miller
		WOAI-TV	ACN	K	4	21.6	10.8	482	1031 Navarro Street	1031 Navarro Street	1031 Navarro Street	5	3	2,016	1	2	–	1	16	650	C. L. Jeffers	H. A. L. Halff
UTAH,	Salt Lake City	KDYL-TV	N	K	4	4	2	-500	Walker Bank Building	68 Regent Street	68 Regent Street	5	2	6,975	–	2	1	–	17	350	J. Baldwin	S. S. Fox
		KSL-TV	ACD	K	5	18.4	9.2	436	Union Pacific Building	Union Pacific Building	Union Pacific Building	3	–	—	–	1	1	1	15	350	Vincent Clayton	C. R. Evans
VA.,	Norfolk	WTAR-TV	ACDN	I	4	24	12	367	720 Bousch Street	720 Bousch Street	Nat'l. Bk. Commerce Bldg.	2	2	6,950-6,975	–	1	1	1	13	1,000	J. C. Peffer	Campbell Arnoux, Pr.
	Richmond	WTVR	CDN	I	6	12.6	6.4	431	Staples Mill Road	3301 W. Broad Street	3301 W. Broad Street	2	2	—	–	1	1	–	26	482	J. W. Kyle	W. M. Havens
WASH.,	Seattle	KING-TV	ACDN	K	5	19	10	410	301 Galer Street	302 Second Avenue, W.	301 Galer Street	2	–	7,000	–	1	1	–	30	1,277	G. A. Freeman	Hugh Feltis
W. VA.,	Huntington	WSAZ-TV	ACDN	K	5	12	8.3	585	8th Street Road	W. Va. Building	W. Va. Building	–	2	(2)-6,000	–	2	–	1	9	432	LeRoy Kilpatrick	Marshall Rosene
WISC.,	Milwaukee	WTMJ-TV	ACDN	I	3	15.9	10.2	325	720 E. Capitol Drive	720 E. Capitol Drive	720 E. Capitol Drive	5	2	7,000	–	1	1	1	101	843	P. B. Laeser	W. J. Damm

Notes: A—ABC Network; C—CBS Network; D—Dumont Network; N—NBC Network; I—Interconnected; K—Kinescope
Population and receiver density figures provided by stations. Station data is latest available at time of going to press.

Noise Generators and

Discussion of noise factor measurements and the limiting sensitivities

By I. J. MELMAN, Chief of Advanced Development and Television Research Air King Products Co., Brooklyn 32, N. Y.*

PART TWO OF THREE PARTS

Practical Measurement Technic, Linearizing Receiver Circuits

IN the basic description of the noise diode technique it was assumed that the receiver circuits are all linear. In most receivers the circuits are linear up to the second detector. Since it is generally simpler to make the measurements following the second detector (i.e., at audio or video frequencies) it will be shown here how the second detector may be linearized for making noise factor measurements. In the case of a communications receiver the second detector is linearized by placing the Beat Frequency Oscillator switch to "on" position. In the case of television or other receivers which do not have a BFO, an oscillator either at the signal or i-f frequency is required.

The function of the c-w signal at the input to the second detector may be described with the aid of Fig. 8 which shows (a) the input-output characteristic of a typical receiver a-g-c deactivated) and (b) the input-output characteristic of the second detector alone. Due to the curvature in the diode characteristic the output is not a linear function of the input for outputs less than B. In Fig. 8(a) the curvature above C is due to overload in the i-f amplifier. The purpose of the c-w signal is to cause the detector to operate in the linear region above B, so that the ratio of receiver noise alone to receiver plus diode noise is the same at the input and output terminals of the detector. If the c-w signal is introduced at the r-f or i-f stages the receiver operates on curve (a) and the c-w signal must not bring the operating point above C. When the c-w signal is introduced at the input to the second detector (BFO), then the operation is on curve (b) and it is not necessary to limit the maximum amplitude of the c-w signal.

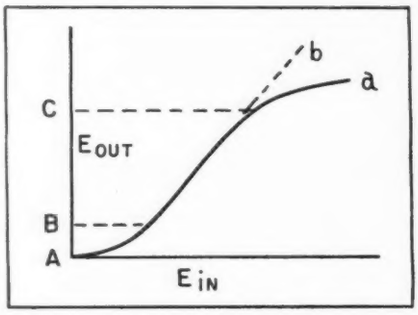

Fig. 8: Input and output characteristics of typical receiver (a-g-c deactivated)

From Fig. 8 it is apparent that adjusting the operating point to the linear region will increase the noise output. However, the very presence of the c-w signal (even without any change in detector slope, i.e., a linear detector) would also increase the noise output. The c-w signal acts as a carrier for the random noise side-bands, and the noise output of the detector due to this heterodyne action will increase with c-w signal until the c-w input is approximately 6 db greater than the noise input to the second detector.[1]

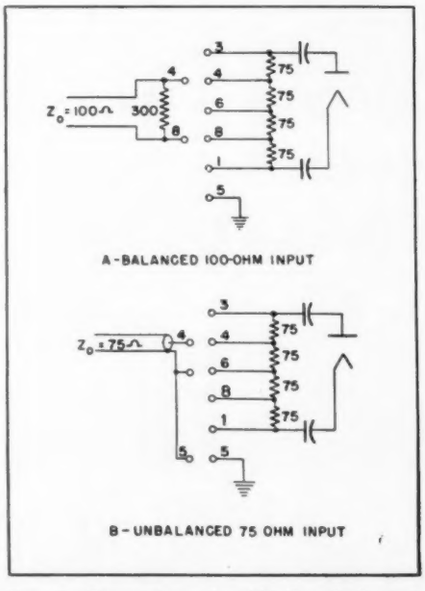

Fig. 9: Connections for 100-ohm balanced and 75-ohm unbalanced input impedances

Therefore, to maintain the linearity of the measuring system, i.e. noise output independent of carrier-to-noise ratio, once the carrier level is set, it is necessary that the carrier always be substantially greater than the r-m-s noise at the input to the detector. This is generally so for communication receivers when the BFO is used, or for television receivers when the simple procedure outlined in the "Television Receiver Measurement" section is followed.

The Output Meter

The similarity of the noise diode output and the receiver noise characteristics simplifies the requirements for the output meter. Since signals of the same type are being added, the output meter need be capable only of indicating relative noise levels. The bandwidth and meter-law characteristics are not critical, hence the meter may be an r-m-s, peak, or average operating type. A few precautions relative to the use of these meters might be cited. Some averaging type meters may tend to overload on the higher portions of the scale, due to the high peak to r-m-s value of noise. Measurements using peak-reading meters are more susceptible to errors resulting from clipping of the noise peaks in the receiver circuits.

An oscilloscope is useful for observing the noise signal applied to the meter. It indicates the possible clipping of noise peaks and the presence of interfering signals or hum.

Measurement Procedure

The general measurement procedure is the same for both types of noise generators. However, for the sake of simplicity the diagrams referred to will be those for the balanced generator.

Communications Receivers

Noise factor measurements are made as follows. Plug in the desired transmission line (Figs. 6 and 9). Set the noise generator frequency selector switch to the proper posi-

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Measuring Technics

of receivers for TV, FM, and communication service

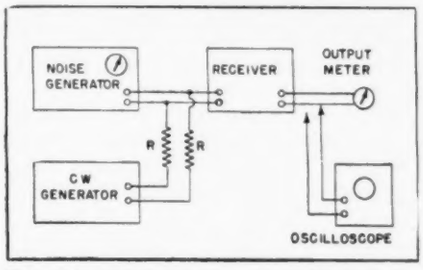


Fig. 10: Arrangement of equipment for noise factor measurements on TV receiver

tion. Place the BFO switch to "on" position. If the receiver has an *antenna trimmer control,* adjust this control for maximum noise output, with the noise generator output turned up. Then decrease the noise generator output to zero (filament voltage off) and note the receiver noise output. Increase the noise diode output until the meter placed at the receiver output reads twice the noise power (1.41 noise voltage). Read the noise factor directly off the db scale of the noise generator meter.

If the dc meter is not calibrated directly in noise factor (db), Eq. (6b) may be applied. Should the noise generator not be capable of increasing the noise output by a factor of 2 (noisy receiver) then Eq. (6c) may be used.

All of several commonly used output and voltage meters proved satisfactory for measurements on communication receivers.

The noise factor measurement should be made with the a.g.c. "off", and the r-f tuner gain adjusted for maximum. Any noise limiting preceding the output meter should be rendered inoperative.

If a screen room is not available care should be exercised that the measurement is made at a frequency at which an interfering signal is not present.

TV Receiver Measurement

For making the noise factor measurement on a television receiver (or any receiver that does not have a beat frequency oscillator) an external signal generator or oscillator may be used. It is not necessary that the c-w source have a calibrated output. Fig. 10 indicates the arrangement of the equipment for making the measurement. The c-w signal may be applied to the receiver input terminals through two relatively large resistors (for a balanced input) so as to have negligible effect on the input impedance. This signal may also be introduced at i-f, to any stage preceding the second detector.

The procedure is now as follows: Plug in the desired transmission line. Set the noise generator frequency switch to the proper position, with the filament voltage turned off. With the c-w carrier set in the center of the television channel, adjust its output until the receiver noise output is increased to about 95% of maximum. Increase the filament voltage of the noise diode until the output meter reads twice the noise power (1.41 noise voltage). Read the noise factor directly off the db scale of the noise generator meter.

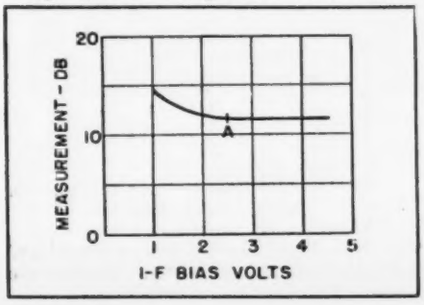
As noted previously, the type of output meter used is not at all critical. However, for practical reasons the meter bandwidth should include a major portion of the bandwidth of the receiver under measurement.

When the c-w signal is supplied by an external oscillator it is necessary that:

1. The noise peaks should be within the linear range of the input-output characteristic (Fig. 8a).
2. The ratio of carrier to noise amplitude at the input to the detector should be at least 9 db. These conditions are generally met in a communications receiver (with BFO on).

In a television receiver, the proper conditions may be obtained by adjusting the i-f bias (r-f bias maintained constant). The i-f bias may be determined by making noise factor measurements, for different values of i-f bias, only on the channel that gives the greatest noise output. These measurements are plotted in Fig. 11. A value of i-f bias past point A, in the flat region of the curve, should be used for this measurement and for measurements on all other channels of this receiver.

Fig. 11: Determining correct TV i-f bias



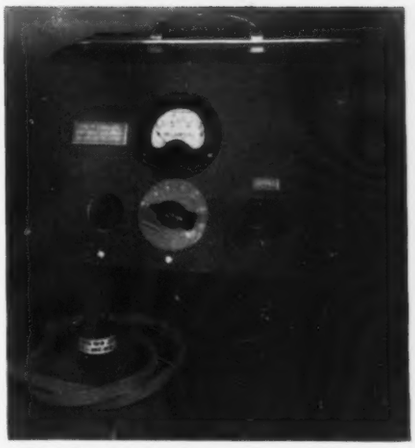


Fig. 12: Balanced noise generator, incorporating noise diode and power supply

The r-f tuner bias should be fixed at that value which in normal operation of the receiver gives maximum gain. If the bias on the tuner stages is controlled by an automatic-gain-control circuit, this bias should be measured with no signal input and then fixed at that value (a-g-c circut deactivated). The i-f bias has already been determined by the procedure outlined above.

FM Receiver Measurement

The considerations governing the measurement of noise factor are the same for FM, television or communications receivers. If the measurement were made prior to any non-linear elements (second detector or limiters) the procedure would be identical. However, when the output indicator follows the FM or AM detector these circuits should be linearized or the relationship between the noise output of the i-f system to the measured output should be shown.

Measurement of the noise factor at the FM detector or the following stages requires extremely careful consideration of the operation of the type of FM detector circuit and any non-linear circuits that may be used. A straightforward procedure for FM receivers is to place a crystal or diode detector (AM) across the output of the last i-f stage, and then proceed as for an AM receiver. (In some cases one section of the FM detector tube may be discon-

nected and used as the AM detector.)

If the noise output of this detector is insufficient to operate the output indicator, then the audio section of the receiver can be used to amplify the noise output (FM detector disconnected). In a receiver which uses a limiter the AM detector must be placed before the limiting circuit. The grid circuit of the limiter may generally be used as the AM detector.

In a receiver which employs a ratio detector and no preceding limiter stage, removal of the stabilizing condenser will give faithful reproduction of the AM modulation of the a-v-c take-off point.

The improvement in signal-to-noise ratio attained in frequency modulation systems (the so-called

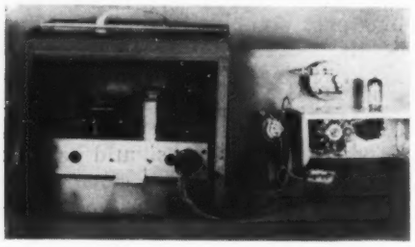


Fig. 13: Generator without front panel

wide-band improvement) is not to be considered an attribute of the r-f section of the receiver, but rather of the modulation and detection scheme employed. The "quieting sensitivity" of an FM receiver is a function of both the noise factor and the AM rejection of the FM detector circuits.

Non-Linear Circuits

If a c-w signal is not available or if it is suspected that the video stages of a television receiver are not linear, the following procedure may be used to measure the noise factor.

A reading, P_o, on the output meter is first obtained with zero signal from the noise generator. The noise generator output is then increased to give a noise output reading P_1, with a noise diode d-c current of I_{d_1}. The i-f gain is then decreased (r-f bias unchanged) and the noise generator output is increased to give the previous meter readings P_o and P_1, and the corresponding d-c readings of I_{d_2} and I_{d_3}. The noise factor is then obtained from

$$F = \frac{I_{d_1} \times I_{d_2}}{I_{d_3} - (I_{d_1} + I_{d_2})} 20R_s \qquad (7)$$

Best accuracy is obtained when the diode current I_{d_3} is made appreciably greater than $I_{d_1}+I_{d_2}$. With this method any non-linearity affects both sets of readings in the same manner and is thus cancelled out in Eq. 7.

Another procedure, which may be employed where non-linear circuits are involved, is as follows: The noise output is noted on the output indicator when the filament current of the noise diode is turned off. Then a 3 db pad is inserted in the receiver, preceding the non-linear circuits (i.e. in the i-f system). The noise diode is then increased until the original reading is obtained on the output indicator. It is, of course, necessary that the pad have a flat characteristic over the pass band.

Noise Generator Band Switch

When using the noise generator the noise reading occasionally goes up when the noise generator selector switch is moved off the correct channel. This is to be expected when the receiver is not well-matched to the transmission line (see discussion of generator output circuit).

Interfering Signals

All sources of noise other than that created by the tuner should be eliminated when making the noise factor measurement. These other possible sources of noise include outside signals, receiver sweep circuits, corona from high-voltage supply, r-f leakage from an r-f high-voltage supply, hum, i-f signal feed-through, and beats (with c-w signal) from i-f harmonic feedback.

Most of these spurious noises can be easily detected with the aid of an oscilloscope placed across the output meter terminals. Some can be detected on the raster of the kinescope tube itself. A well-designed screen room should eliminate

TABLE I

Channel	Incremental No. of Turns Plate	Filament
13	Strap	4
11-12	*	*
9-10	*	*
7-8	*	*
FM	6	8
5-6	4	5
4	5	6
2-3	5	6

Diameter—5/16"
Spacing between turns—adjust for correct center frequency
Wire—No. 20

*These inductances are hairpin shaped and are adjustable. The relative lengths are illustrated in Fig. 7.

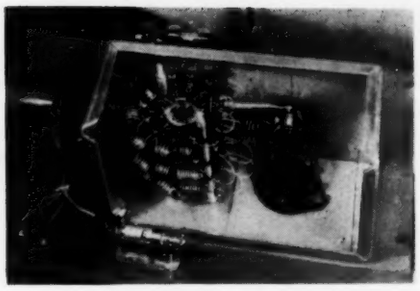


Fig. 14: Balanced switch tuning layout

interference from outside signals.

Signals from the horizontal or vertical sweep circuits may sometimes be picked up by the video circuits. These would not be apparent on the television picture-tube raster since they generally occur during the blanking interval but they may be observed on an oscilloscope. If these sweep or high-voltage power supply interferences are present in the output, deactivation of the source will eliminate them.

If hum from the receiver is observed on the oscilloscope (or raster) it may be filtered from the meter circuit by placing a simple high-pass RC filter (cutoff of several thousand cycles for a television receiver) between the receiver take-off point and the meter.

Sometimes beats may be observed when the c-w signal is applied to the receiver. These may be the result of feedback to the front end of harmonics of the i-f signal. The measurement may be taken without investigating the shielding or filtering problem by detuning the c-w generator until the interference disappears and then readjusting the input level.

When a vacuum-tube voltmeter whose range includes the i-f frequency is used, it may sometimes be observed that the voltmeter reading will continue to increase as the c-w signal is increased while the kinescope raster or the oscilloscope across the voltmeter will show the noise beginning to decrease. This is due to i-f feedthrough and can be eliminated by better i-f filtering. A resistor of 10,000 ohms or so in series with the meter may suffice.

General Noise Diode Circuit Considerations

The design of a practical and accurate noise generator for the television frequencies requires that consideration be given to the diode tube capacitance, circuit capacitances, lead lengths, d-c circuits and termination. The equivalent circuit of

(*Continued on page* 86)

TELE-TECH's NEWSCAST

Du Mont Color Tube Patent

A patent for a three-color direct-view television tube has just been issued to Allen B. Du Mont Laboratories, Inc. The tube was invented by Henry Kasperowicz and patent was applied for October 26, 1945.

In its construction, the new tube is similar to the familiar black-and-white picture tube except for a new form of fluorescent screen, composed of tiny fluorescent dots which give forth red, blue, and green colors respectively when struck by the electron beam. The tiny dots are arranged so that each dot of one color is adjacent to adjoining dots of another color.

In operation, as the electron beam passes over the tiny color spots successively, it is turned on and off rapidly in accordance with both the brightness and color of the picture to be reproduced. The tube can be used in any one of the three color systems now proposed before the FCC; it can also be used as a fully compatible system with present black-and-white standards, thus avoiding obsolescence of existing receivers. From a manufacturing standpoint, the patent is particularly applicable for the construction of "larger picture" sized tubes.

Armstrong Proposed Phonevision in 1933

At the presentation of the Zenith film on Phonevision on May 5, before the Radio Club of America Inc. of New York, by Colonel John R. Howland of Zenith Radio Corporation, Major Edwin H. Armstrong rose from the audience to point out how the secret of Phonevision had been narrowly missed in the past.

He stated that he had recognized the importance of a box-office for television as early as 1933 and he read from a memorandum disclosure that he had made to friends in RCA, suggesting that the video portion of the television signal be sent by air and that the synchronizing pulses be sent by telephone. He went on to point out that the only trouble with his idea was that the telephone wires would not handle his system of synchronizing signals as Phonevision does.

Dr. Armstrong pointed out that the random key signal of the Zenith Phonevision invention made a practical thing out of the idea for box-office television for which he and others had sought an answer.

RCA Enlarges Receiving Tube Facilities

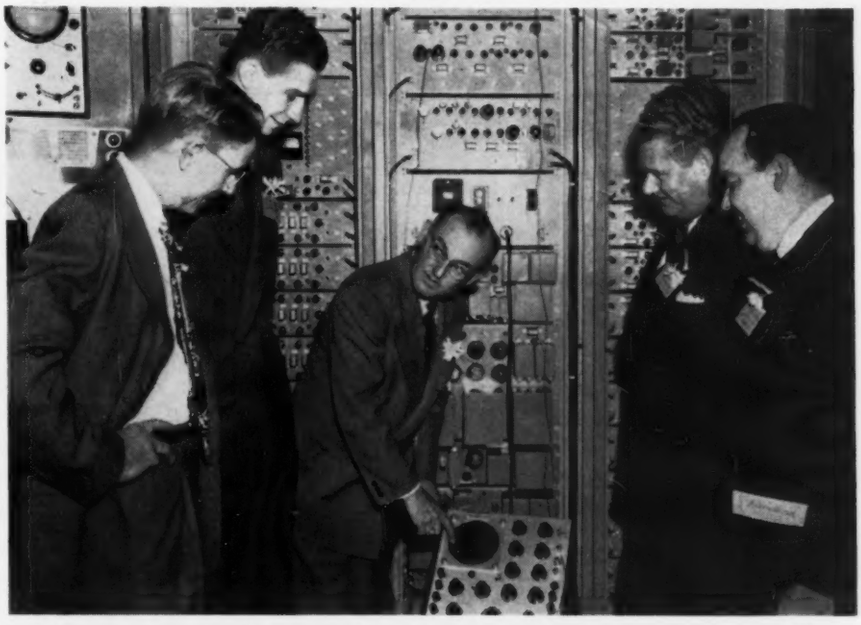
The Tube Dept. of Radio Corporation of America has announced the purchase of a new building in Harrison, N. J. that provides 126,000 sq. ft. of additional space for the expansion of its tube manufacturing program. Acquisition of this new building is one of the steps which has been taken to provide increasing quantities of both receiving and other types of electron tubes for the rapidly expanding radio-television industry.

During the past two years RCA's receiving tube facilities at Indianapolis have been undergoing intensive expansion so that this plant, as well as the Harrison plant, are now producing tubes at an all-time record high volume. RCA's television picture tube production facilities have also been expanded at both Lancaster, Pa., and Marion, Ind.

TBA Committee Chairmen Named for 1950

The Television Broadcasters Assoc., Inc., through J. R. Poppele, president, has announced its new committee chairmen for 1950. Among the new appointments are: Dr. Allen B. Du Mont, who takes over as chairman of the Finance committee and Frank Marx, vice president in charge of engineering for ABC, appointed chairman of the TBA Engineering committee. E. B. Loveman, vice president of Philco, has been named head of the Executive Committee of Affiliates. Reorganization of existing committees is to take effect with the appointment of new chairmen.

GE MICROWAVE ON TRANSCONTINENTAL GAS PIPELINE



L. Peine, Houston GE radio communications equipment district representative explaining operation of microwave multiplex equipment to pipeline communication engineers, M. Rhodes, Tennessee Gas Transmission Co., and D. R. Wofford, Texas Gas Transmission Corp. at left. P. Chamberlain, Manager of Sales for GE's Commercial Equipment Div., and L. W. Goostree, Sales Manager of Radio Communication equipment, are at right. Equipment, shown at annual convention of Petroleum Industry in Houston, Texas, is of the type to be used along the 1840-mile pipe line system from Mercedes, Texas to Newark, N. J. which will be installed by the Transcontinental Gas Pipe Line Corp. The complete system includes 154 —2000 MC transmitter-receiver combination equipments

Dr. A. N. Goldsmith's Other Color TV Inventions

In July, 1940, Dr. Alfred N. Goldmith (who gets credit for idea behind present RCA color tube) conceived the idea of a color-television tube in which the viewing screen was covered with tiny pyramids bearing phosphors on their sides. He also developed circuit arrangements that could be used to make this tube operative. Professor Charles W. Geer of the University of Southern California conceived a similar idea for the tube (but not the circuits) some time later, but filed for a patent in the United States Patent Office a few weeks ahead of Dr. Goldsmith. These applications were the subject of interference proceedings in the Patent Office, and patents covering different claims were issued to both Dr. Goldsmith and Dr. Geer in 1949.

Dr. Goldsmith also has an issued patent on another ingenious color-television solution including vertical color fluorescent strips with a vertical narrow elliptical scanning beam or beams.

Dr. Goldsmith is a former vice-president and general engineer of RCA, and for many years has been a prominent consulting engineer with offices on Fifth Avenue (now 597), New York City.

Lansing Mid West Exhibit

James B. Lansing Sound, Inc., Los Angeles, on July 10 will have a travelling communication exhibit for two weeks with planes used during the entire trip. Besides Lansing speaker systems and units, Magnecord recorders and McIntosh amplifiers will be displayed. Points for stop-overs include: Lincoln, Neb.; St. Louis, Mo.; Kansas City, Wichita and other cities in the three-state area.

Continental to Make TV Picture Tubes

H. A. McIlvaine has acquired control and been elected president of Continental Electric Co., Geneva, Ill.

"We expect to set up facilities for the manufacture of TV picture tubes of all sizes for the television industry," explained Mr. McIlvaine, who was identified with some of the earliest cathode-ray experimentation and supervised embryonic engineering developments of this tube at Purdue University.

"Continental Electric Co. is today the recognized leader in the field of phototube manufacture," added Mr. McIlvaine, "and at present, under the trade name of Cetron, we supply over 91% of the projector manufacturers."

W. S. Sims is executive vice-president in charge of production, and Edward C. Hanson is continuing as sales and advertising manager.

Coming Events

June 12-16 — AIEE Summer and Pacific General Meeting, Huntington Hotel, Pasadena, Calif.

June 14-17 — Annual Colloquium of College Physicists, State University of Iowa, Iowa City, Pa.

June 22-24 — Acoustical Society of America, State College, Pa.

June 26-30 — American Society for Testing Materials, Chalfonte-Haddon Hall, Atlantic City, N. J.

July 10-13 — National Association of Music Merchants, Annual Convention, Palmer House, Chicago.

July 24-26—Conference on Ionospheric Physics, Pennsylvania State College, State College, Pa.

August 28-31—Associated Police Communication Officers, Inc., National Conference, Hotel Hollenden, Cleveland, Ohio.

September 13-15 — IRE West Coast Convention and 6th Annual Pacific Electronic Exhibit, Municipal Auditorium, Long Beach, Calif.

September 25-27—National Electronics Conference, Edgewater Beach Hotel, Chicago, Ill.

October 23-27 — AIEE Fall General Meeting, Oklahoma City, Oklahoma.

French-German 1939 Approach to Color TV

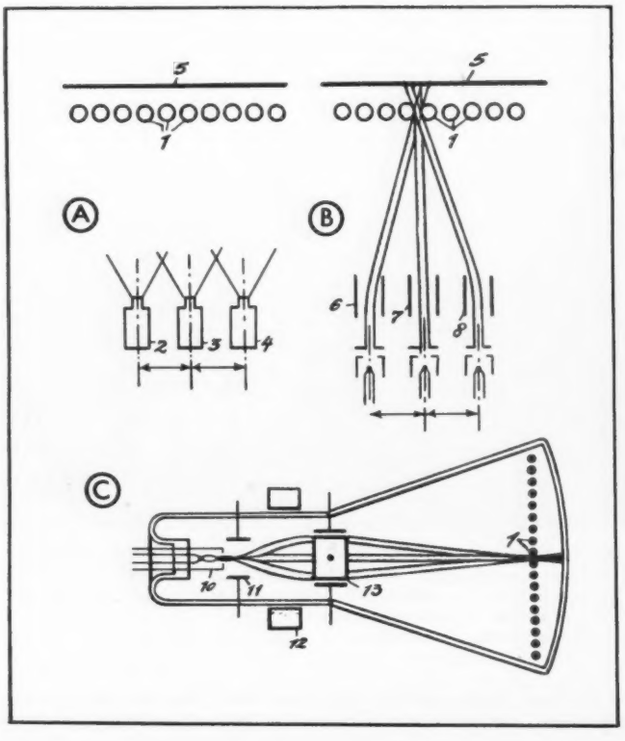


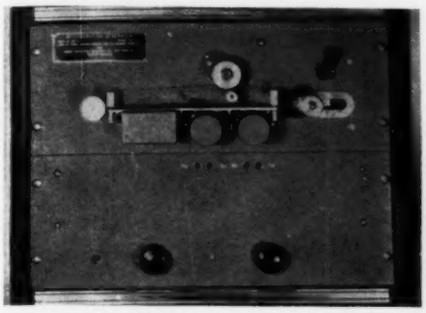
Diagram from the French patent No. 866.065 issued in 1941 which describes construction of a cathode ray tube capable of fluorescing in three different colors At A three spray nozzle assemblies are shown, each of which sprays the screen (5) with a different color fluorescent material thru the parallel grid wire structure (7). In B, replacing the nozzles with electron-gun assemblies makes each electron stream arriving at the screen arrive at the same angle as the originally deposited coating. Thus each stream will actuate only one color. A single gun assembly type tube is shown at C. Here through a preliminary deflection system three streams are formed out of the one which act on the tube surface in the same manner as described above

In this French patent for a tri-color cathode ray tube, issued to a German applicant in 1941, a masking "gridiron" of parallel wires is first used as a stencil to aid in squirting parallel stripes of color-phosphors (blue, green, red) on tube face from three nozzles. Later, with same wire gridiron in finished tube, three corresponding electron guns (or a single gun with beam deflected into three similar paths) are employed to excite respective phosphors by proper angular passage of electrons through the slots between wires, so as to hit only the desired phosphor stripes. Some engineers suggest that this parallel-slot-and-stripe electron mechanism may be regarded as an early approach to the phosphor-triangle-and-aperture construction employed in recent color-tubes demonstrated at Washington. From the standpoint of image pickup in studios, the patent also foreshadows certain aspects of present CBS system, since the use of a continuous tri-colored film strip or a rotating disc with tri-colored segments is prescribed. French Patent No. 866.065 assigned to Fernseh Aktiengesellschaft by Simonnot et Rinut.

NEW EQUIPMENT for Designers and Engineers

Reverberation Generator

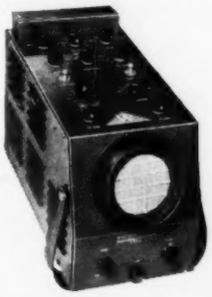
An artificial reverberation generator for the addition of reverberation to radio, video, and recorded sound channels consists of two 7-in.



rack panels. This basic unit will operate in conjunction with most broadcast type audio consoles. Input and output levels are at zero VU, and the frequency response is suited to wide range live program material. For use in other services, the artificial reverberation generator is available with its own microphone preamplifier, isolation amplifier, control panel, VU meter, and sound effects filter. —**Audio Facilities Corp., 608 Fifth Ave., New York 20, N. Y.**—TELE-TECH

Wide Band Pocketscope

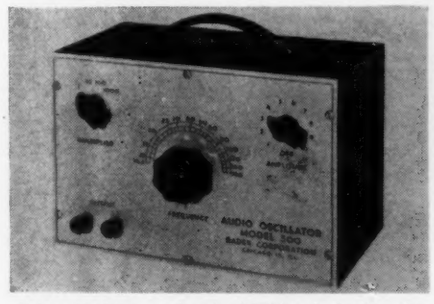
Model S-14-B wide band Pocketscope is ideal for radiom pulse analysis or transient investigation and has a linearized triggered



or repetitive time base which is continuously variable from ½ cps to 50 KC with either ± polarity of sync or trigger. Amplifier sensitivity is of the order of 50 mv rms/in. and internal calibration of trace amplitude is provided. Observations of limited wave form areas are facilitated by a trace expansion better than four times screen face. Input attenuators and gain controls are non-frequency discriminating.—**Waterman Products Co., Inc., 2445 Emerald St., Philadelphia 25, Pa.**—TELE-TECH

Audio Oscillator

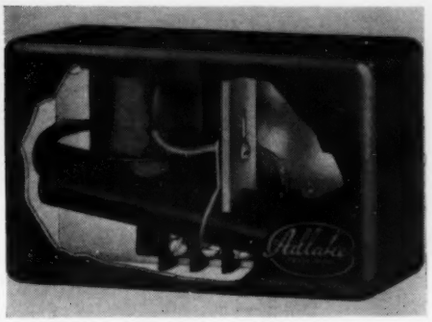
The wide range signal produced by the model 500 audio oscillator combined with the instrument's extremely low distortion and



noise content make it highly desirable for use with distortion meters or other test application. Output is 10 v. into 2000 ohms and internal impedance is 100 ohms at full output. Frequency range is 14.5 to 145,000 cps in 4 ranges. Distortion is ¼ of 1% with high impedance loads, 1% with 2000 ohm load. Output variations is ± 1 db. Power requirements are: 30 watts, 110 v. ac, 50-60 cps.—**Radex Corp., 2076 Elston Ave., Chicago 14, Ill.**—TELE-TECH

Relay

Hermetically sealed, silent and chatterless and requiring no maintenance, the No. 5000 relay operates at 115 v., 60 cps on only 0.007 amp. With this low amperage operating the coil, the relay contacts will handle 5 amps. at the same voltage. Ideally suited for circuits where the output of the tube is limited the No. 5000 has a rated lifetime of 30 million operations. It can be used as a pilot relay operating from a very sensitive thermo-



regulator and functions perfectly with either mercury-and-glass or bi-metal regulators.—**Adams & Westlake Co., 1117 N. Michigan, Elkhart, Ind.**—TELE-TECH

High Fidelity Speaker System

Aimed at the ultimate in quality reproduction, combined with maximum sound distribution, the model 418 corner cabinet speaker system incorporates two powerful permanent magnet speakers and a highly efficient horn and driver system. These components are mounted in an enclosure of adequate size for optimum low-frequency loading. Provision is made for use of the new Stephens Tru-Sonic Hy-Son high-frequency reproducer system. Components include two model 103LX 15-in. low-frequency drivers, one model 824H 2 x 4 800 cps horn, the new Tru-Sonic model 108 high-frequency driver, and a model 800X crossover network.—**Stephens Manufacturing Corp. Culver City, Calif.**—TELE-TECH

Disc Recorder

Model RA-116 Radiotone disc recorder, for 33 1/3 and 78 rpm discs, will record on 96 to 140 lines per in. either outside-in or inside-

out. Frequency response is 50 cps to 20 KC ± 0.5 db. Unit operates from 100-watt input. The turntable assembly is completely belt driven and pivoted on one steel ball with oilite bushings on the shaft. This is said to eliminate any rumble or gear noise common to most medium-priced recorders. The lathe assembly is also isolated from mechanical noise through the use of a rubber driving unit. Dynamically-balanced turntable weighs 12 lbs. and the carriage has a built-in pressure adjustment which controls the depth of cut and may be adjusted while in operation. Signal-to-noise ratio on recorded discs is greater than 80 db when a high quality cutting stylus is used. List, $825.—**Ellinwood Industries, Electronics Div., 2916 Tilden Ave., Los Angeles 64, Calif.**—

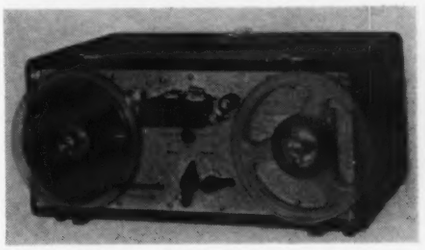
Amplifier

A newly-developed circuit in the A-332A amplifier eliminates the need for several elements now necessary in microphone

amplifier systems. With this new circuit, power for the condenser impedance matching tube is obtained from the amplifier rectifiers. No input transformers or input matching transformers are required. Three inputs are provided: two for the new Altec miniature condenser microphone, and one for variable reluctance phonograph pickup. Each of the three channels is provided with independent gain and bass controls. When more than 18 watts are required (normal output of A-332A), the unit may be used to drive the 75-watt Altec A-247B amplifier.—**Altec Lansing Corp., 1161 N. Vine St., Hollywood 38, Calif.**—TELE-TECH

3-Head Recorder

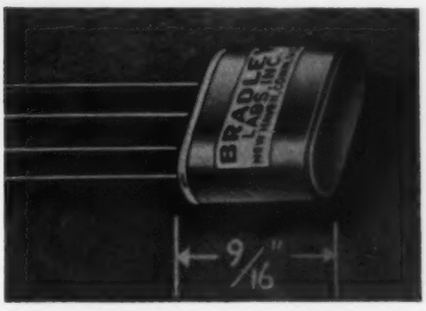
A 3-head tape recorder which will monitor tape while it is being recorded has been designed and designated the PT63-A. All heads,



contained in a single housing, can be individually aligned or replaced as required. Record and reproduce heads are each triple-shielded to minimize hum and cross-talk. The PT63-J10 single channel amplifier which has separate record and playback amplifiers has been incorporated in the recorder. In addition, the PT63-A contains a 10-watt amplifier which can be used for playback and will drive an external speaker as well. Incorporating all the features and fidelity of the PT6, the new Magnecorder PT63-A recorder mechanism provides a frequency response that is flat from 50-15,000 cps, ± 2 db, at 15 i.p.s. At 7½ i.p.s. tape speed the response is 50-7500 cps, ± 2 db.—**Magnecord, Inc., 360 N. Michigan, Chicago 1, Ill.**—TELE-TECH

Copper Oxide Rectifier

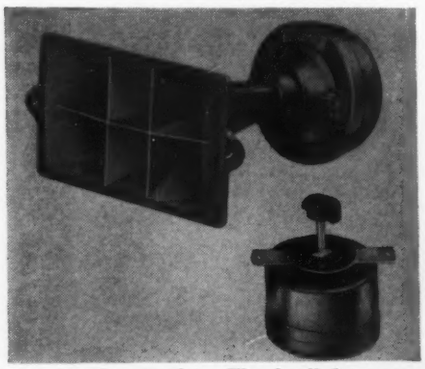
A series of hermetically-sealed copper oxide rectifiers have been developed for conventional bridge center tap, half wave circuits



or as balanced and matched units for modulators and related equipment. Model number is CX3. They are rated up to 6 v., ac and 5 ma, dc, and are supplied with four tinned leads. Sealed container is 11/16 x 9/16 x ¼ in.—**Bradley Laboratories, Inc., 82 Meadow St., New Haven, Conn.**—TELE-TECH

Tweeter Reproducer

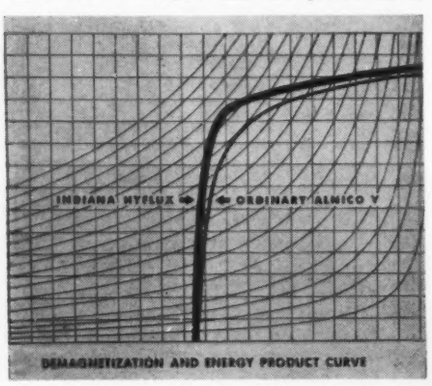
A multi-cellular tweeter reproducer (model HR-2) and high pass filter has been developed for use with any suitable type of



cone speaker woofer. The 6-cell horn provides a wide angle distribution pattern and the response is clean and efficient to 15 KC. It will handle 25 watts of program material above 1 KC. Dimensions of horn are: 6¾ x 3½ x 8 in.—**Atlas Sound Corp., 1449 39th Street, Brooklyn 18, N. Y.**—TELE-TECH

Permanent Magnets

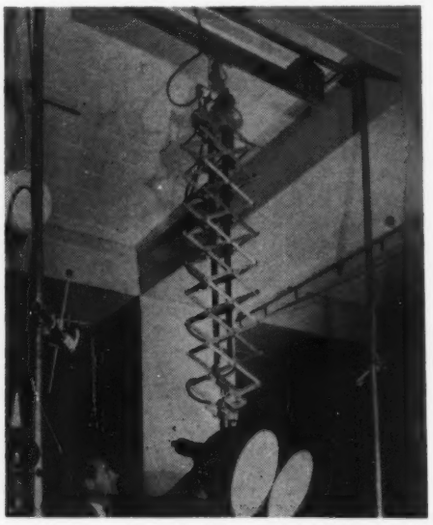
Permanent magnets with a guaranteed energy product of a least 5¼ million BHmax have been developed and are priced on a



par with Alnico V. The highest published guaranteed energy product for regular Alnico V is said to be 4½ million BHmax, so that even at the new minimum guarantee, 16% greater strength is claimed for this line of permanent magnets. Demagnetization and energy product curve of the new magnets (Indiana Hyflux) and ordinary Alnico V are shown in graph illustration.—**Indiana Steel Products Co., Valparaiso, Ind.**—TELE-TECH

Motorized Skyhook

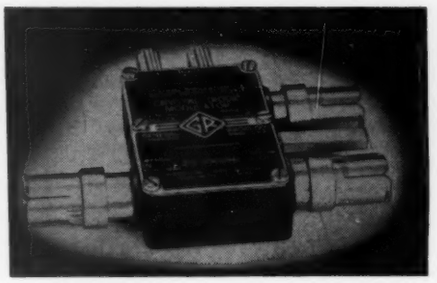
The Skyhook lighting mount has been motorized and mounted on an electric track to provide horizontal as well as vertical flexibility. A double-throw toggle switch enables the operator to elevate the device by throwing the switch upward. Moving the



switch to a neutral position turns off the motor and throwing the switch in a downward position will make the unit descend. Limit switches automatically turn off the motor at the top and bottom of the Skyhook's travel. The light units shown in illustration are twin Video-lights but the Skyhook can handle anything from small spots to large fluorescent fixtures. Maximum extension is approximately 11 ft. and load capacity is about 22 lbs. Special models are made on order with extensions up to 24 ft. and load capacities of 60 lbs.—**Display Lighting, Inc., 417 East 61st St., New York 21, N. Y.**—TELE-TECH

Crystal Diode Modulator

Useful in the laboratory and in TV receiver production testing, the model 1000-P6 crystal diode modulator converts an oscillator, stand-



ard signal generator, or other r-f source into a test-signal generator. It modulates the oscillator signal after attenuation, so that reaction on the oscillator frequency is negligible. Range of modulating frequencies is zero to 5 MC and carrier-frequency range is 20 to 1000 MC, covering the proposed UHF TV bands, as well as currently used frequencies. It is equipped with type 874 coaxial connectors for r-f input, output and for modulation input. Adaptors are available for connection to other types of terminals. Impedance is 50 ohms for r-f circuits, and coaxial 50-ohm attenuators and other accessories can be supplied.—**General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass.**—TELE-TECH

Miniature Tubes

Unusual care is exercised in the manufacture of 5 new miniature tubes; types 5749, 5750, 5725, 5726 and 5686. The heaters are

designed to withstand many thousand cycles of intermittent operation, tolerances are held to close specifications, and additional inspections and special tests take place during production. The 5749, a remote cut-off pentode, is used as an r-f and i-f amplifier. It features low grid capacitance and under typical operating conditions has a transconductance of 440 micromhos with a plate current of 11 ma.

The 5750, a miniature pentagrid converter, is used as a combined oscillator and mixer in superheterodyne receivers and has a conversion transconductance of 475 micremhos.

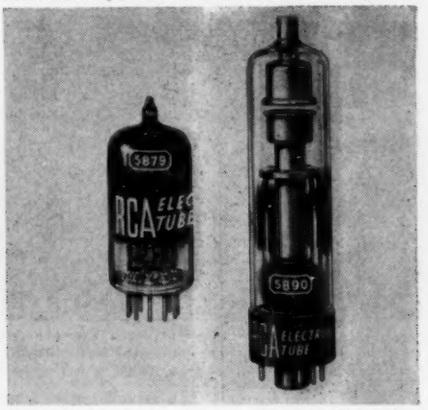
The 5725 is a miniature semi-remote cut-off pentode. Used in gated amplifiers, gain-controlled amplifiers, delay circuits, and mixer circuits, its control grid and suppressor grid can be used as independent control elements.

The 5726, a miniature twin diode, may be used as an AM-FM detector, automatic-volume-control rectifier, and low-current power rectifier. The tube features high perveance and since the heaters for the two diode sections are internally connected in a series, a heater failure makes both sections inoperative.

The 5686, a miniature pentode power amplifier, is used as a Class A audio power amplifier or Class C r-f power amplifier up to 160 MC. There are multiple leads on the cathode and screen grid which facilitate r-f by-passing at high frequencies. A useful power output of 5.25 watts at 125 MC or a Class A audio power output of 2.7 watts can be obtained.—**Tube Divisions, General Electric Co., Schenectady, N. Y.**—TELE-TECH

Sharp- and Remote-Cutoff Pentodes

A sharp-cutoff pentode (5879, left in illustration) of the 9-pin miniature type has been developed for use as an audio amplifier

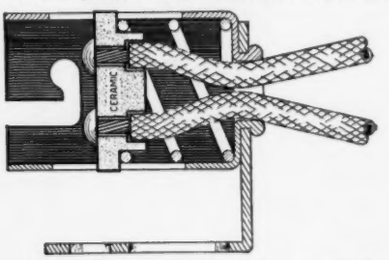


in applications requiring reduced audio noise. Utilizing a single-ended structure which is relatively short and rigidly mounted to minimize microphonics, the new tube has a controlled getter deposit to minimize internal leakage, and a double-helicol-coil heater to minimize hum.

The 5890 (right in illustration) is a low-current beam pentode of the remote-cutoff type intended particularly for the voltage regulation of high-voltage dc power supplies. It has a maximum dc plate-voltage rating of 30,000 v., a maximum dc plate-current rating of 500 μamps., and a maximum plate-dissipation rating of 10 watts.—**Radio Corporation of America, Tube Dept., Harrison, N. J.**—TELE-TECH

Dial Light Sockets

Sockets of the new NE 12 series are now available for mounting lamps with double contact bayonet bases. The wire leads ter-



minate under the socket shell in contacts mounted in a heavy ceramic disc. Recesses in the under side permit the wire covering to enter the disc so that no live metal is exposed. The ceramic disc insures effective insulation of the sockets even when hot lamps are used in them. When high ambient temperatures are anticipated, asbestos covered wire leads may be specified for maximum resistance to the effects of heat.—**Dial Light Company of America, Inc., 900 Broadway, New York 3, N. Y.**—TELE-TECH

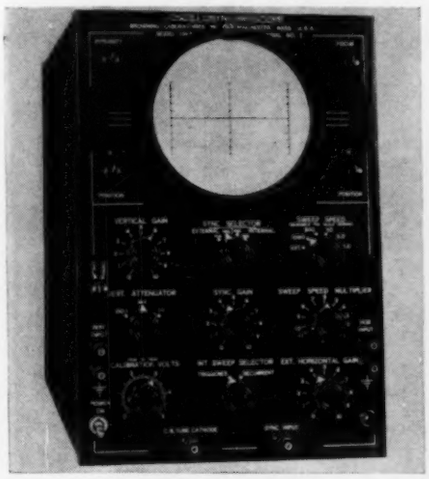
Radio Cue System

Model AB radio cue system for the direction of personnel on the studio floor enables actors and technical assistants to move about

freely, unencumbered by trailing communication wires. The transmitter operates on a low r-f frequency into a loop antenna, which restricts the transmitted information to a closely confined area. Several r-f channels are available, should simultaneous transmission for separate activities be desired. The pocket receivers (illustrated) are small and lightweight—**Polarad Electronics Corp., 100 Metropolitan Ave., Brooklyn 11, N. Y.**—TELE-TECH

Oscillosynchroscope

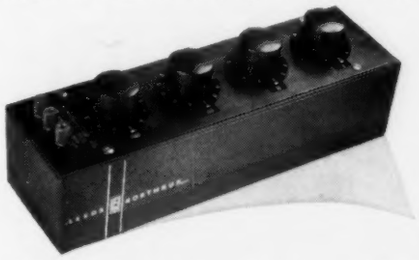
A new oscillosynchroscope, model ON-5, has been designed to provide wide band amplifier and versatile sweep facilities in a single port-



able unit. It is particularly well adapted to the study of pulse and transient phenomena as well as being useful in conventional oscillographic applications. Vertical amplifier response is flat within 3 db from 5 cps to 5 MC. Horizontal amplifier is direct-coupled with high frequency response extending to 500 KC. The sweep generator may be triggered or recurrent with direct reading writing rate calibration for any internal sweep condition. Triggered sweep speeds from 1.0 μ sec./in. to 25,000 μ sec./in. and recurrent sweeps of 10 to 100 KC are available.—**Browning Laboratories, Inc., Winchester, Mass.**—TELE TECH

Resistance Boxes

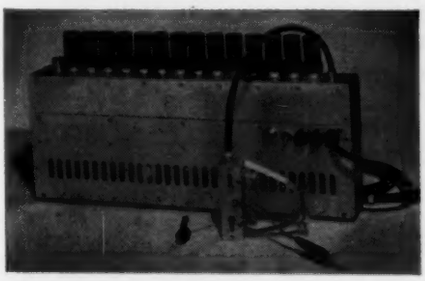
Resistance boxes for use as moderate-precision, adjustable stands for dc and ac resistance measurements up to medium fre-



quencies have been developed. Principal feature of the boxes is an entirely new type of rotary switch having exceptionally low and stable contact resistance, obtained through the use of solid silver switch contacts and silver alloy multiple-leaf brushes. Zero or contact resistance is less than 0.002 ohm per decade and changes less than 0.0005 ohm per decade on accelerated life tests. Switches are totally enclosed to keep out dust, and are equipped with adjustable indexing action. Terminals are knurled, all-metal, and plated for low contact resistance.—**Leeds & Northrup Co., 4934 Stention Ave., Philadelphia 44, Pa.**—TELE-TECH

Chain Pulse Amplifier

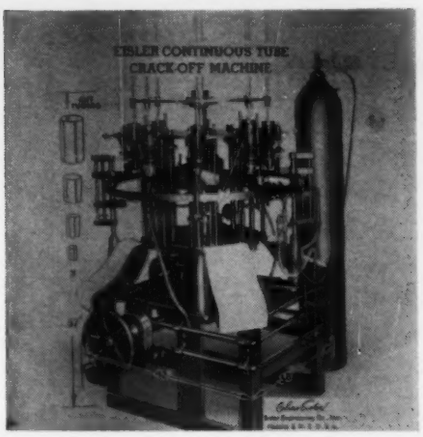
Designed to amplify very fast pulses and transients, the model 214 chain pulse amplifier has a bandwidth of 40 KC to 100 MC and a gain of 30 db. The input impedance of 180 ohms is designed to match the output



impedance of the series 200 wide band chain amplifiers for additional gain up to 60 db. A special termination at the end of 15 in. of cable is provided for convenient use with a DuMont 5XP CR tube for the viewing of high speed pulses. With an output voltage of 65 v. and a rise time of 6 millimicroseconds, 1 in. of deflection is obtained under the stiffest beam conditions. A second output is also provided for connection to high speed counters and other associated equipment. Standard connectors are used at the input and no special cable and fittings are required. — **Spencer-Kennedy Laboratories, Inc., Dept. TT, 186 Cambridge Ave., Cambridge 39, Mass.**—TELE-TECH

Tube Crack-Off Machine

The operation of a new motor-driven automatic crack-off machine is based principally on creating a strained section on the tubing



where the severed end is required. Passing the glass through an intensive gas-oxygen fire and touching the heated section with a cold steel disc causes a complete cracking-off of the predetermined length of the tubing. The machine is designed to cut glass tubing from 5-ft. sections to lengths ranging from ⅛ to 4 in. Output of the machine is approximately 3,000 to 4,000 pieces per hour, depending on diameter and wall thickness of the tubing. Only one operator is required to attend as many as three machines.—**Eisler Engineering Co., Inc., 750 South 13th St., Newark 3, N. J.**—TELE-TECH

Oscilloscope Camera

An adaptation of the Polaroid-Land camera makes it possible to photograph the screen of a 5-in CR oscilloscope and produce a

print for engineering study one minute after exposure. Designated the F-284, this new camera delivers an accurate photographic record of single transients or repetitive phenomena without the need for darkroom processing. Data can be recorded on the back of prints or prints can be mounted in engineer's notebook and data recorded there. A two-position over-center switch facilitates the reproduction of two recordings on one print. Writing speeds up to 1 in./μ sec. have been recorded with an accelerating potential of 3000 v. With higher accelerating potentials writing speeds up to 50 to 60 in./μ sec. are possible. Print size is 3¼ x 4¼ in. with the two recorded images reduced by a ratio of only 2 to 1 from the original trace.—**Fairchild Camera & Instrument Corp., c/o W. J. Schubert, 88-06 Van Wyck Blvd., Jamaica 1, N. Y.**—TELE-TECH

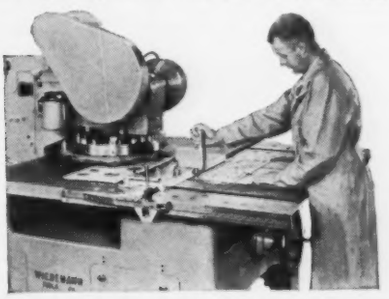
Rectangular TV Tube

Featuring the exclusive Du Mont bent-gun design, model 16TP4 TV tube is a rectangular which provides a picture 14 7/8

in. wide including all the scanning area of the transmitted signal. A gray filter faceplate is used for improvement of contrast in the presence of ambient light. As a conversion tube, the 16TP4 will provide a larger rectangular picture in existing cabinets than original round tube equipment.—**Allen B. Du Mont Laboratories, Inc., 2 Main Ave., Passaic, N. J.**—TELE-TECH

Punch Press

The RA-41P turret punch press has been developed for high speed piercing of electrical panels, radio and television chassis



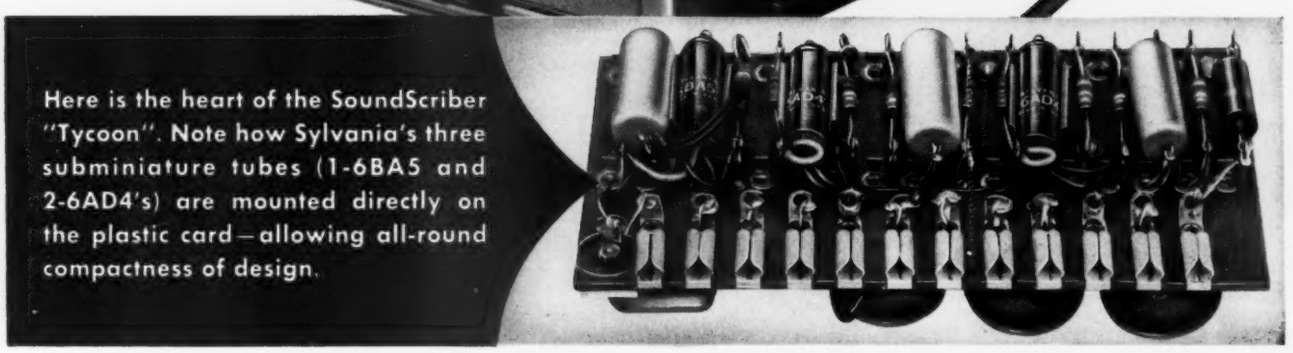
and switchboards. It combines the pantograph for rapid hole location with the turret for quick access to punches and dies. The turret of the machine carries 16 to 20 different punches and dies up to 3 in. in diameter. A handwheel, conveniently located near the operator, roatates the turret to put any punch or die in piercing position in 2 seconds. The press will handle sheets up to 28 x 40 in. and can exert a pressure of 15 tons, with an 11/16 in. stroke of the ram which operates at 175 strokes per min.—**Wiedemann Machine Co., 4275 Wissahickon Ave., Philadelphia 32, Pa.**—TELE-TECH

Microwave Signal Source

A series of microwave signal sources have been developed covering the 634 to 8340 MC range in four units. These reflex klystron

signal sources are controlled by a single dial and frequency is read directly from a linear indicator to accuracies of ½ %. The reflector voltage is automatically tracked with the cavity tuner. There are no klystron nodes to set, no voltage settings to be made and frequency can be read directly without resorting to charts or graphs. Model SSR covers 634 to 1174 MC; model SSL—1140 to 2184 MC; model SSS—2145 to 4310; and model SSM—4290 to 8340 MC. All units are supplied complete with tubes.—**Polarad Electronics Corp., 100 Metropolitan Ave., Brooklyn 11, N. Y.**—TELE-TECH

GREAT LITTLE TUBES FOR A GREAT LITTLE INSTRUMENT



Here is the heart of the SoundScriber "Tycoon". Note how Sylvania's three subminiature tubes (1-6BA5 and 2-6AD4's) are mounted directly on the plastic card—allowing all-round compactness of design.

Sylvania's subminiature tubes are one of the secrets that enable SoundScriber to make the world's lightest, most compact dictation instrument. Only 15 lbs., the "Tycoon" covers as little desk space as an ordinary letter. Such concentration of electronic efficiency is typical of the advantages offered by Sylvania's subminiature tubes.

The "Tycoon" also owes much of its reputation for reliability to the Sylvania subminiatures that serve it . . . for they are lightweight little wonder-workers that stand up to heavyweight treatment.

In electronics, wherever compactness demands minimum size . . . wherever dependability is wedded to economy . . . you'll find Sylvania subminiatures at work, cutting space, cutting costs, cutting servicing requirements and replacement. Write Sylvania Electric Products Inc., Dept. R-2406, Emporium, Pa.

SYLVANIA ELECTRIC

RADIO TUBES; TELEVISION PICTURE TUBES; ELECTRONIC PRODUCTS; ELECTRONIC TEST EQUIPMENT; FLUORESCENT LAMPS, FIXTURES, SIGN TUBING, WIRING DEVICES; LIGHT BULBS; PHOTOLAMPS; TELEVISION SETS

WASHINGTON
News Letter

Latest Radio and Communications News Developments Summarized by Tele-Tech's Washington Bureau

COLOR-TV HEARINGS END—The color-television hearings of the FCC, which have spanned a period of ten months, at long last have come to an end. Commission will concentrate on digesting of nearly 12,000 pages of testimony and exhibits on most difficult assignment in the agency's history in determining the best answer to give the public color video. Brigadier General David Sarnoff, RCA board chairman, in "marathon" hearing totaling some 18 hours over two days (and until 11 p.m. the second day) gave the FCC its "climax" in testimony that "laid it on the line" about RCA being opposed to any color-television system other than a compatible all-electronic method of transmission and reception.

EARLY OPENING OF UHF URGED—Forthright and clear-cut in his testimony and answers to cross-examination, General Sarnoff hurled down the gauntlet on the CBS system which he termed "unsound" and "degraded" and likely to cause tremendous confusion in future television with radio manufacturers and telecasters going bankrupt, loss of video audiences, and layoffs of employees. The RCA board chairman also told the FCC that VHF definitely should be retained for both color and black-and-white and that steps should be taken promptly to open and develop UHF for both services, although he warned very little yet is known about UHF for commercial television.

ENGINEER-STUDY THE SOLUTION? — Despite some scoffings from government circles and from certain television interests, proposal of Dr. W. R. G. Baker, head of the RMA Engineering Department and General Electric vice-president in charge of electronics, to have color-television problems turned over to the National Television System Committee to have a comprehensive impartial engineering survey, had real merit. Assembly of best engineering minds in radio field was generally regarded as better course of determination of this momentous video step, than winnowing out wheat from chaff of the scores of statements and answers of the witnesses before the FCC.

RCA PATENT POLICIES—Countering suggestion of one FCC attorney about RCA having "dominance" in radio and television patents, General David Sarnoff drove home thought to Commission and to Washington officialdom that RCA was the leader in research and inventions and that without RCA efforts it was doubtful the United States would have gained its world preeminence in television. This was accomplished despite the intense competition in American radio-television manufacturing—and as Gen. Sarnoff said there is "more competition in radio manufacturing than a dog has fleas"—through the broad and liberal patent licensing policy of RCA and availability of other companies' patents through RCA sublicenses, including Farnsworth, A. T. & T., E.M.I. of England and Westinghouse.

MANUFACTURERS' MOBILE CERTIFICATES—A proposal to "thaw out" the huge backlog of FCC mobile radio applications which has arisen since the changeover of frequencies for the various services last fall has been presented to the Commission by Motorola, Inc. Under the Motorola plan which was also distributed to fifteen other leading mobile-radio equipment manufacturers such as RCA, GE, Philco, Link, Federal etc., manufacturers of two-way mobile radio communications equipment would issue a "certificate of manufacturer" to station operators who would file it with the FCC and use it as an operating authorization until the regular issuance of a license by the Commission. Under the plan the FCC would send all applications for construction permits to the equipment manufacturer specified and the manufacturer would either issue a certificate which would be returned to the Commission or notify the government agency that he could not issue such a certificate. The plan is similar to that used by the FCC in the case of airplane and marine shipboard licenses.

FAVOR TV INTERCONNECTION—Generally, television broadcasters have expressed views to the FCC favoring the interconnection of Western Union and Bell System inter-city television relay facilities at Commission hearings which are not yet concluded and were interrupted in early May by the sudden death of FCC Chief Examiner J. Fred Johnson, Jr. J. R. Poppele, vice-president in charge of engineering for the Bamberger Broadcasting Corp. and Washington's WOIC-TV, stressed television industry would gain "tremendous advantage by having two competitors providing inter-city facilities" and believed there was plenty of room for both Western Union and Bell System, while DuMont engineering director Rodney K. Chipp and ABC television Vice President Ernest L. Jahncke, Jr., believed interconnection and competition meant lower costs and better service but said stations would probably operate with a single communications company to avoid problems of divided responsibility. NBC Vice President William S. Hedges and CBS Vice President Adrian Murphy indicated that the Bell System coaxial was satisfactory but also felt interconnection might be desirable policy for FCC to authorize.

National Press Building
Washington, D. C.

ROLAND C. DAVIES
Washington Editor

Another DUMONT First...

Picture tube sizes for television have been paced by Du Mont for the past decade. And again it's Du Mont with the rectangular tube in *the size the public wants* — a rectangular with screen area (150 sq. in.) comparable with the round sixteen-inch tube. There is no need to sacrifice picture size to incorporate the advantages of the rectangular tube. This latest Teletron* features the exclusive Du Mont-designed Bent Gun for the sharpest focus and longest life free from ion spot blemishes. For that extra sales appeal, incorporate this newest Du Mont design in your receiver. Write for complete specifications.

GENERAL SPECIFICATIONS...

Overall length	18⅝"
Greatest dimension of bulb	16⅝"
Minimum useful screen diagonal	15½"
Base	Duodecal 5 pin
Bulb contact	Recessed small cavity cap
Anode voltage	12,000 volts DC
Grid No. 2 voltage	300 volts DC
Focusing coil current	115 approx. ma. DC
Grid No. 1 circuit resistance	1.5 max. megohms

FIRST WITH THE FINEST IN TV TUBES

DUMONT Teletrons*

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*Trade-mark

ALLEN B. DU MONT LABORATORIES, INC. • TUBE DIVISION • CLIFTON, N. J.

TELE·TECH

TV FM AM DIRECTORY

STATION & STUDIO EQUIPMENT

1951

- Transmitters
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- Lab Equipment
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TELE-TECH'S 1951
TV-FM-AM STATION & STUDIO EQUIPMENT DIRECTORY

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Receivers, AM & FM .....TB
Receivers, TV .....TT
Power supplies .....TP
Auxiliary power supplies .....TS
Storecasting equipment .....TU
AM transmitters .....TM
FM transmitters .....TF
TV transmitters .....TV
Transit radio equipment .....TW

Accurate Engineering Co., 2005 Blue Island Ave., Chicago 8, Ill.—TP, TS
Admiral Corp., 3800 Cortlandt St., Chicago 47, Ill.—TB, TT
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American Merri-Lei Corp., 918 Halsey St., Brooklyn 33, N. Y.—TB
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Amplifier Corp. of America, 398 Broadway, New York 13, N. Y.—TP
Andrea Radio Corp., 27-01 Bridge Plaza N., Long Island City 1, N. Y.—TT, TB
Ansley Radio & Television, Inc., 41 St. Joe's Ave., Trenton 9, N. J.—TB, TT
Arc Radio Corp., 523 Myrtle Ave., Brooklyn 5, N. Y.—TC
Arlington Electric Products, Inc., 500 W. 52nd St., New York 19, N. Y.—TC
Atlas Coil Winders Inc., 392 State St., Stamford, Conn.—TB, TT
Atwater Television Co., 360 Furman St., Brooklyn, N. Y.—TB, TT
Audar Inc., Walnut & Maple Sts., Argos, Ind.—TB, TR
Audio Industries, 1001 Green St., Michigan City, Ind.—TB
Autocrat Radio Co., 3855 N. Hamilton Ave., Chicago 18, Ill.—TB
Automatic Electric Sales, 1033 W. Van Buren St., Chicago 7, Ill.—TA
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Bel Canto Electronic Laboratories, 7556 Melrose Ave., Los Angeles 46, Calif.—TB, TR
Bell Radio Co., 125 E. 46 St., New York 17, N. Y.—TB, TT
Bell Television Inc., 552 W. 53 St., New York 19, N. Y.—TB, TT
Belmont Radio Corp., Div. Raytheon Mfg. Co., 5921 W. Dickens Ave., Chicago, Ill.—TB, TT, TR
Bendix Radio Div., Bendix Aviation Corp., Baltimore 4, Md.—TB, TT
Berger Communications, 109-01 72 Rd., Forest Hills, L. I., N. Y.—TB, TT
Beta Electric Corp., 1762 Third Ave., New York 29, N. Y.—TP, TS
Bliley Electric Co., Union Station Bldg., Erie, Pa.—TX
Bowers Battery & Spark Plug Co., Box 1262, Reading, Pa.—TB, TT
Breon Laboratories, 1520 Evergreen Rd., Williamsport, Pa.—TX
Brite-Ray Television Co., 7 Clinton St., Brooklyn 2, N. Y.—TT
Brociner Electronics Laboratory, 1546 Second Ave., New York 28, N. Y.—TB
Browning Laboratories, 750 Main St., Winchester, Mass.—TP
Brunswick Div., Radio & Television Inc., 244 Madison Ave., New York 16, N. Y.—TB, TT
Bunnell & Co., J. H., 81 Prospect St., Brooklyn 1, N. Y.—TP, TS, TM, TF
Burnett Radio Laboratory, Wm. W. L., 4814 Idaho St., San Diego 16, Calif.—TX
Cage Projects, 393 Grove St., Upper Montclair, N. J.—TT
Calbest Eng'g & Electronics, 828 N. Highland Ave., Hollywood 38, Calif.—TT, TR
Capehart-Farnsworth Corp., 3700 Pontiac St., Fort Wayne 1, Ind.—TB, TT
Cascade Television Co., 179 South St., Newark, N. J.—TB, TT
Certified Radio Laboratories, 5507 13th Ave., Brooklyn 19, N. Y.—TB, TT
Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—TC, TP
Collins Audio Products Co., P. O. Box 368, Mountainside, N. J.—TV, TB, TU, TW
Collins Radio Co., 855 35th St., N. E., Cedar Rapids, Iowa—TC, TX, TA, TP, TS, TM, TF
Commercial Radio Equipment Co., International Bldg., Washington, D. C.—TX
Communication Devices Co., 2331 12th Ave., New York 27, N. Y.—TR, TP, TM, TF
Communications Co., 300 Greco Ave., Coral Gables 34, Fla.—TR
Conn, Telephone & Electric Corp., 70 Britannia St., Meriden, Conn.—TR
Conrac, Inc., Glendora, Calif.—TT
Continental Electronics, 1728 Wood St., Dallas 1, Texas—TA, TM
Convertible Television, 630 Fifth Ave., New York 20, N. Y.—TT
Coronet Radio & Television Corp., 500 W. 52 St., New York 19, N. Y.—TT
Corvek Corp., 1005 N. W. 16 St., Portland 9, Ore.—TS
Covrall Industries Inc., 55 Ferris St., Brooklyn 31, N. Y.—TB
Crest Transformer Corp., 1834 W. North Ave., Chicago 22, Ill.—TP, TS
Crosley Div., Avco Mfg. Corp., 1329 Arlington St., Cincinnati 25, Ohio—TB, TT
Crystal Research Laboratories, 29 Allyn St., Hartford, Conn.—TX
Daven Co., 191 Central Ave., Newark, N. J.—TZ
Dayton Airadio, Inc., P. O. Box 167, Vandalia, Ohio—TP
Delco Radio Div., General Motors Corp., Kokomo, Ind. TB
DeWald Radio Mfg. Corp., 35-15 37 Ave., Long Island City, N. Y.—TT, TB
DuMont Laboratories Inc., Allen B., 1000 Main Ave., Clifton, N. J.—TC, TA, TR, TP, TS, TV, TT
Eastern States Radio & Television Co., 427 E. 138 St., New York 54, N. Y.—TT
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Eidson Electronic Co., P. O. Box 31, Temple, Texas—TX
Electromatic Mfg. Corp., 88 University Pl., New York N. Y.—TT
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Electronic Controls, 69 Glenwood Pl., E. Orange, N. J.—TT
Electronic Creations, 367 Greenwich St., New York 13, N. Y.—TT, TB
Electronic Instrument Co., 276 Newport St., Brooklyn 12, N. Y.—TX
Electronic Systems Corp., 112 W. 18 St., Kansas City 8, Mo.—TB
Electronic Transformer Co., 207 W. 25 St., New York 1, N. Y.—TP, TS
Electro Technical Industries, 1432 N. Broad St., Philadelphia 21, Pa.—TT
Electro Vision Industries, Div. H. D. Campbell Co., Rochelle, Ill.—TB, TT
El-Tronics Inc., 2647 N. Howard St., Philadelphia 33, Pa.—TR
Eltron, Inc., 407 N. Jackson St., Jackson, Mich.—TR, TS
Emerson Radio & Phonograph Corp., 11 Eighth Ave., New York 11, N. Y.—TB, TT
Empire Radio, 125 E. 46 St., New York 17,—TB, TT
Erco Radio Laboratories, Stewart Ave., Garden City, L. I., N. Y.—TR
Espey Mfg. Co., 528 E. 72 St., New York 21, N. Y.—TB, TT, TR
Fada Radio & Electric Co., 525 Main St., Belleville, N. J.—TB, TT
Falstrom Co., Falstrom Court, Passaic, N. J.—TC
Federal Telecommunication Laboratories, 500 Washington Ave., Nutley 10, N. J.—TC, TP, TV
Federal Telephone & Radio Corp., 100 Kingsland Rd., Clifton, N. J.—TC, TF, TV
Federal Television Corp., 139 Duane St., New York 13, N. Y.—TB, TT
Ferrar Radio & Television Corp., 55 W. 26 St., New York 10, N. Y.—TB
Finch Telecommunications Inc., 10 E. 40 St., New York 16, N. Y.—TR
Fisher Radio Corp., 41 E. 47 St., New York, N. Y.—TB, TT
Flush Wall Radio Co., 31 Clinton St., Newark 2, N. J.—TB
Freed Radio Corp., 200 Hudson St., New York 13, N. Y.—TB, TT
Furst Electronics, 12 S. Jefferson St., Chicago 6, Ill.—TP, TS
Garod Electronics Corp., 70 Washington St., Brooklyn 1, N. Y.—TB, TT
Garrett-Buckley Radio & Television Corp., 524 S. Michigan Ave., Chicago, Ill.—TT
Gates Radio Co., Quincy, Ill.—TC, TX, TP, TS, TM, TF TA
General Electric Co., Electronics Dept., Syracuse, N. Y.—TC, TX, TA, TR, TP, TS, TM, TF, TV, TB, TT
Gonset Co., 72 E. Tujunga, Burbank, Calif.—TR
Gray Research & Development Co., 16 Arbor St., Hartford 1, Conn.—TA
Grem Engineering Co., 206 8th Ave., Brooklyn 15, N. Y.—TB, TT
Hallicrafters Co., 4401 W. Fifth Ave., Chicago 24, Ill. TB, TR, TT
Hamilton Electronics, 2726 Pratt Ave., Chicago 45, Ill.—TP
Hammarlund Mfg. Co., 460 W. 34 St., New York, N. Y.—TR
Harvey Radio Laboratories, 447 Concord Ave., Cambridge 38, Mass.—TR
Harvey-Wells Electronics, North St., Southbridge, Mass.—TR
Hedco Mfg. Corp., 4564 Broadway, Chicago 40, Ill.—TB
Heyman Mfg. Co., 500 Michigan Ave., Kenilworth, N. J.—TX
Highland Engineering Co., 32 Holman Blvd., Hicksville, L. I., N. Y.—TP
Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—TB, TT, TR, TP, TS, TM, TF
Hudson American Corp., 25 W. 43 St., New York, N. Y.—TR
Hunt Corp., 453 Lincoln St., Carlisle, Pa.—TX
Industrial Development Eng'g Assoc., 55 N. Jersey St., Indianapolis, Ind.—TB
Industrial Television Inc., 359 Lexington Ave., Clifton, N. J.—TB, TT
Industrial Transformer Corp., Gouldsboro, Pa.—TP
International Television Corp., 238 William St., New York 7, N. Y.—TB, TT
Interstate Television Corp., 2320 Valentine Ave., New York 57, N. Y.—TT
Islip Radio Mfg. Corp., Beech St., Islip, N. Y.—TR
Jackson Industries, Inc., 58 E. Cullerton St., Chicago 16, Ill.—TB, TT
Jamaica Television Mfg Co., 95-26 Sutphin Blvd., Jamaica 4, L. I., N. Y.—TR, TV, TT, TB
James Knights Co., 101 E. Church St., Sandwich, Ill.—TX (See ad P. 39)
Jewel Radio Corp., 10-40 45 Ave., Long Island City 1, N. Y.—TB
Jones Electronics Co., M. C., 96 N. Main St., Bristol, Conn.—TA
Kalbfell Laboratories, 1076 Morena Blvd., San Diego, 10, Calif.—TR
Kepco Laboratories, 149-14 41 Ave., Flushing, L. I., N. Y.—TP,TS
Kingston Radio Co., Kokomo, Ind.-TB,TT

Kraft Mfg. Co., 1027 Findlay Ave., Bronx, N. Y.—TB
LaMagna Mfg. Co., 51 Clinton Pl., E. Rutherford, N. J. —TB
Lambda Electronics Corp., 103-02 Northern Blvd., Corona, L. I., N. Y.—TP
Lance Television Laboratories, 1738 Jerome Ave., Bronx 53, N. Y.—TT
Lear, Inc., 110 Ionia St. N.W., Grand Rapids 2, Mich. —TB, TR
Link Radio Corp., 125 W. 17 St., New York, N. Y. —TR, TV, TU, TW
Magnavox Co., 2131 Bueter Rd., Ft. Wayne, Ind.— TB, TT
Majestic Radio & Television Corp., 70 Washington St., Brooklyn 1, N. Y.—TB, TT
Manufacturers Television Co., 99 Featherbed Lane, New York 52, N. Y.—TB, TT
Marathon Sales Co., 466 W. 42 St., New York 18, N. Y.—TB, TT
Mattison Television & Radio Corp., 893 Broadway, New York 3, N. Y.—TB, TT
Meck Industries, Plymouth, Ind.—TB, TT
Meissner Mfg. Div., Maguire Industries Inc., Mt. Carmel, Ill.—TB, TT, TR
Millen Mfg. Co., James, 150 Exchange St., Malden, Mass.—TR
Miller Laboratories, August E., 9226 Hudson Blvd., N. Bergen, N. J.—TX
Model Rectifier Corp., 1510 Nostrand Ave., Brooklyn 26, N. Y.—TP, TS
Monitor Products Co., 815 Fremont Ave., S. Pasadena, Calif.—TX
Motorola, Inc., 4545 Augusta Blvd., Chicago 51, Ill. —TB, TT
M. P. Concert Installations, Fairfield 10, Conn.—TB, TT
Multiple Television Mfg. Co., 987 Hegeman Ave., Brooklyn 6, N. Y.—TT
National Co., 61 Sherman St., Malden 48, Mass.—TT, TR
National-Simplex-Bludworth, Inc., 92 Gold St., New York 7, N. Y.—TT
Nebel Laboratory, R. E., 1104 Lincoln Pl., Brooklyn 13, N. Y.—TX
Neptune Electronics Co., 433 Broadway, New York 13, N. Y.—TA, TP
Nielsen Television Corp., Norwalk, Conn.—TB, TT
Noblitt-Sparks Industries, Arvin Radio & TV Div., Columbus, Ind.—TB, TT
Northern Radio Co., 314 Bell St., Seattle 1, Wash. —TR
Olympic Radio & Television, Inc., 3401 38 Ave., Long Island City 1, N. Y.—TB, TT
Onan & Sons, D. W., 43 Royalston Ave. N., Minneapolis 5, Minn.—TS
Orthon Corp., 196 Albion Ave., Paterson 2, N. J.—TR
Pacific Electronics, 16 Lyndon Ave., Los Gatos, Calif. —TT
Packard-Bell Co., 12333 W. Olympic Blvd., Los Angeles 64, Calif.—TB, TT
Panoramic Radio Corp., 92 Gold St., New York, N. Y. —TR
Pathe Television Corp., 5302 Second Ave., Brooklyn 32, N. Y.—TB, TT
Peerless Television & Radio Co., 6508 Euclid Ave., Cleveland, Ohio—TT
Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.— —TR, TB, TT
Philharmonic Radio Co., 119 W. 57 St., New York, N. Y.—TB, TT
Phoenix Electronics, Lawrence & Canal Sts., Lawrence, Mass.—TT
Piezo Products Co., Whitney St., Framingham, Mass.— TX
Pilot Radio Corp., 3706 36 St., Long Island City, N. Y.—TT
Pioneer Television Co., 3219 Woodland Ave., Philadelphia 4, Pa.—TT
Polarad Electronics Corp., 100 Metropolitan Ave., Brooklyn 11, N. Y.—TP
Precision Piezo Service, 427 Mayflower St., Baton Rouge, La.—TX
Precision Products, Inc., 719-17 St. N. W., Washington, D. C.—TX
Press Wireless Mfg. Co., Cantiague Rd., Hicksville, L. I., N. Y.—TM, TR
Radio Corp. of America, RCA-Victor Div., Camden, N. J. —TC, TX, TA, TR, TP, TS, TM, TF, TV, TB, TT
Radio Craftsmen, Inc., 1617 S. Michigan Ave., Chicago, Ill.—TB, TT
Radio Engineering Laboratories, 36-40, 37 St., Long Island City, N. Y.—TF, TR, TB
Radio Mfg. Engineers, 302 First Ave., Peoria, Ill.—TR
Radiomarine Corp. of America, 75 Varick St., New York 13, N. Y.—TR
Radio Receptor Co., 84 N. Ninth St., Brooklyn 11, N. Y.—TR
Radio Specialty Mfg. Co., 2023 S. E. Sixth Ave., Portland 14, Ore.—TX
Radio & Television Products, 12 Seventh Ave., S. Hopkins, Minn.—TR
Ram Electronics Inc., S. Buckhout St., Irvington, N. Y. —TS
Ray-Dyne Mfg. Corp., 347 E. 22 St., Paterson, N. J. —TB
Raytheon Mfg. Co., 138 River St., Waltham, Mass.— TC, TX, TP, TS, TM, TA, TF, TV
Ready-Power Co., 11231 Freud Ave., Detroit 14, Mich. —TP, TS
Reeves-Hoffman Corp., 321 Cherry St., Carlisle, Pa. —TC, TX, TM, TF, TV
Reeves-Soundcraft Corp., 35-54 36 St., Long Island City, N. Y.—TT
Regal Electronics, 603 W. 130 St., New York, N. Y. —TB, TT
Remler Co., 2101 Bryant St., San Francisco 10, Calif. —TB, TT
Sargent-Rayment Co., 212 Ninth St., Oakland 7, Calif. —TB
Scientific Radio Service, 4301 Sheridan St., University Pk., Hyattsville, Md.—TX
Scott Inc., Herman Hosmer, 385 Putnam Ave., Cambridge 39, Mass.—TA
Scott Radio Laboratories, 4541 Ravenswood Ave., Chicago, Ill.—TB, TT
Seeburg Radio Corp., J. P., 1500 Dayton St., Chicago 32, Ill.—TB
Sentinel Radio Corp., Evanston, Ill.—TB, TT
Setchell Carlson, Inc., 330 Fifth Ave., New Brighton, Minn.—TB
Shevers, Inc., Harold, 33 W. 46 St., New York, N. Y. —TB, TT
Sierra Electronic Corp., P.O. Box 346, San Carlos, Calif.—TP, TS, TM, TF
Sightmaster Corp., 385 North Ave., New Rochelle, N. Y. —TB, TT
Silver Co., Inc., McMurdo, 1249 Main St., Hartford 3, Conn.—TR
S. M. A. Co., 4721 N. Kedzie Ave., Chicago 25, Ill. —TT
Snaider Television Corp., 540 Bushwick Ave., Brooklyn, N. Y.—TB, TT
Sonar Radio Corp., 59 Myrtle Ave., Brooklyn, N. Y.—TR
Sonora Radio & Television Corp., 325 N. Hoyne Ave., Chicago 12, Ill.—TB, TT
Soundview Marine Co., 267 City Island Ave., Bronx, N. Y.—TB
Sovereign Television Co., 5508 N. Utrecht Ave., Brooklyn 19, N. Y.—TT
Southwestern Industrial Electronic Co., 2831 Post Oak Rd., Houston 19, Texas—TA, TP, TS
Sparton Radio-Television, Jackson, Mich.,—TB, TT
Speak-O-Phone Recording & Eqpt. Co., 23 W. 60 St., New York 23, N. Y.—TR
Spellman Television Co., 3029 Webster Ave., Bronx, N. Y.—TT
Sproco Mfg. Inc., 16607 S. Halldale Ave., Gardena, Calif.—TB
Standard Electronics Corp., 25 W. 43 St., New York 18, N. Y.—TC, TX, TA, TP, TS, TM, TF
Standard Piezo Co., P. O. Box 164, Carlisle, Pa.—TX
Starrett Television Corp., 601 W. 26 St., New York, N. Y.—TB, TT
States So., 19 New Park Ave., Hartford 6, Conn.—TA
Stewart-Warner Electric Co., 1826 Diversey Parkway, Chicago 14, Ill.—TB, TT, TR
Stolle Engineering & Mfg. Co., 3970 S. Grand Ave., Los Angeles, Calif.—TT
Stromberg-Carlson Co., 100 Carlson Rd., Rochester, N. Y.—TB, TT
Sylvania Electric Products Inc., Colonial Radio & Television Div., 1280 Main St., Buffalo 9, N. Y.—TB, TT
Symphonette Corp., 112 E. Walton St., Chicago 11, Ill.—TB
Symphonic Radio & Electronic Corp., 292 Main St., Cambridge 42, Mass.—TT
Symphony Radio & Television Corp., 825 W. Pico Blvd., Los Angeles 46, Calif.—TB, TT
Taybern Equipment Co., 120 Greenwich St., New York, N. Y.—TB, TT, TR
Tech Laboratories Inc., Bergen & Edsall Blvds., Palisades Park, N. J.—TA
Tech-Master Products Co., 443 Broadway, New York 13, N. Y.—TT
Telecoin Corp., 12 E. 44 St., New York 17, N. Y.—TT
Telecraft Corp., 2 W. 15 St., New York 11, N. Y.—TT
Telectro Industries Corp., 35-16-37 St., Long Island City 1, N. Y.—TA, TR, TP, TS
Tele King Corp., 601 W. 26 St., New York, N. Y.—TT
Telequip Radio Co., 1901 S. Washtenaw Ave., Chicago 8, Ill.—TB, TT
Tele-Tone Radio Corp., 540 W. 58 St., New York 19, N. Y.—TB, TT
Tele-Video Corp., 10 E. 52 St., New York 22, N. Y. —TT
Television Assembly Co., 540 Bushwick Ave., Brooklyn, N. Y.—TT
Television Utilities Corp., 1261 Broadway, New York 1, N. Y.—TR
Televista Corp., 1201 44 Ave., Long Island City, N. Y. —TB, TT
Telindustries, Inc., 4921 Exposition Blvd., Los Angeles 16, Calif.—TT
Thordarson Electric Mfg. Div., Maguire Industries, 500 W. Huron St., Chicago 10, Ill.—TP, TS
Trad Television Corp., Asbury Park, N. J.—TB, TT
Transmitter Equipment Mfg. Co., 345 Hudson St., New York 14, N. Y.—TC, TP, TS, TM, TR
Transvision Inc., 460 North Ave., New Rochelle, N. Y. —TB, TT
Trans-Vue Corp., 1139 S. Wabash Ave., Chicago 5, Ill.—TB, TT
Trav Ler Radio Corp., 571 W. Jackson Blvd., Chicago, Ill.—TB, TT
Tru-Vue Television Co., 99 Featherbed Lane, Bronx 52, N. Y.—TT
Trylon Radio Laboratories, 1136 N. American St., Philadelphia 23, Pa.—TB, TR
U. S. Motors Corp., 584 Nebraska St., Oshkosh, Wisc. —TS
U. S. Recording Co., 1121 Vermont Ave N.W., Washington 5, D. C.—TC, TA, TP, TS

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Designed for AM broadcast transmitter frequency control. Low heat loss, plus or **minus 1°C stability. Various** voltage heaters. Excellent for new and replacement applications. FCC approved.

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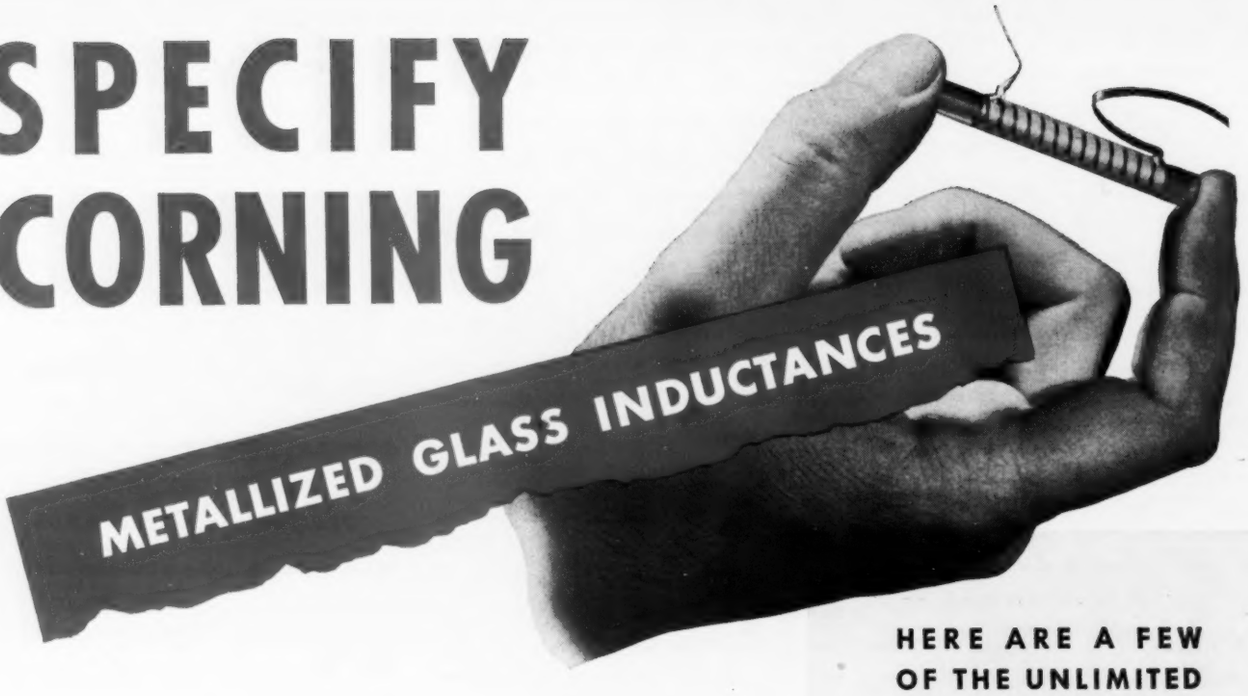

For Economical, Trouble-Free Design and Assembly

Here is a positive solution to your high frequency inductance problems—Corning Metallized Glass Inductances. For F.M. and television applications, they offer a new standard of quality, versatility and economy.

Corning Metallized Glass Inductances combine specially selected glass forms with fired-on conductors to give remarkably high temperature stability and low loss. This means you are assured of negligible drift characteristics, even under unusual temperature changes. In many instances, the use of stable Corning Metallized Inductances eliminates the need of including additional stabilizing components in the circuit. Being precision made, every Corning inductance of a given type can be duplicated within very close tolerances in any quantity.

Easy and convenient to use, Corning inductances can stand repeated handling during production assembly. They are readily installed by conventional soldering methods or grommet mounting techniques. The tin electroplated surface facilitates soldering and minimizes oxidation. Low initial cost, accuracy, ease of installation and durability contribute to production economy.

Corning inductances can be designed to fit your most exacting high frequency inductance requirements. They can be obtained as fixed tuned, permeability tuned or permeability tuned inductance-trimmer combinations. Uniform variable or double pitch windings are easily supplied. Let Corning engineers help solve your inductance problems. They will be glad to discuss them with you.

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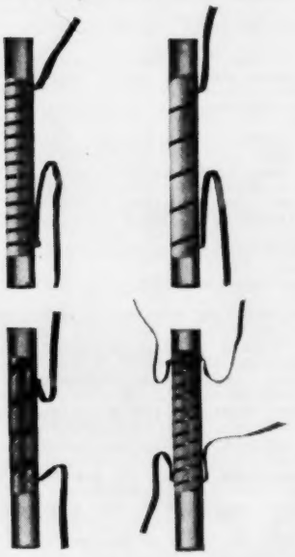

Corning Metallized Inductances are superior in every way for high frequency applications. Their electrical characteristics include low temperature coefficients, high Q and high stability. The smooth glass wall insures noiseless tuning and fine adjusting screws permit rapid and accurate alignment.

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U. S. Television Mfg. Corp., 3 W. 61 St., New York, N. Y.—TB, TT
Universal Television System, 3015 First Ave., Kansas City 3, Mo.—TT
Valpey Crystal Corp., 1244 Highland St., Holliston, Mass.—TX
Vidcraft Television Co., 780 E. 137 St., New York 54, N. Y.—TB, TT
Video Corp. of America, 229 W. 28 St., New York, N. Y.—TB, TT
Videodyne, Inc., 33 Jefferson St., Stamford, Conn.—TB, TT
Video Products Corp., 42 West St., Red Bank, N. J.—TB, TT
Wells-Gardner & Co., 2701 N. Kildare Ave., Chicago, Ill.—TB, TT
Western Sound & Electric Laboratories, 805 S. Fifth St., Milwaukee, Wisc.—TC
Westinghouse Electric Corp., Construction & Communications Sec. 10-L, E. Pittsburgh, Pa.—TC, TA, TR, TM, TF
Westinghouse Electric Corp., Home Radio Div., Sunbury, Pa.—TB, TT
Westline Electronics Co., 11660 Olympic Blvd., Los Angeles 25, Calif.—TX
Wilcox-Gay Corp., Charlotte, Mich.—TB, TT
Willard Storage Battery Co., 246 E. 131 St., Cleveland 1, Ohio—TS
Zenith Radio Corp., 6001 W. Dickens Ave., Chicago 39, Ill.—TB, TT
Zephyr Products Co., 160 E. 116 St., New York, N. Y.—TB

2—Remote Pickup

Antennas	PA
Control consoles	PC
Crystals	PX
Auxilliary equipment	PE
Micro-wave equipment	PM
Receivers, fixed	PR
Receivers, mobile	PT
Power supplies	PS
Auxiliary power supplies	PP
AM transmitters	PQ
FM transmitters	PF
TV transmitters	PV
Trucks	PK
Vibration mountings	PZ

Accurate Engineering Co., 2005 Blue Island Ave., Chicago 8, Ill.—PS, PP
Allied Radio Corp., 833 W. Jackson Blvd., Chicago 7, Ill.—PE
Alpar Mfg. Co., 466 St. Francis St., Redwood City, Calif.—PA
American Communications Corp., 306 Broadway, New York 7, N. Y.—PC, PE, PR, PS, PP
American Electroneering Co., 2112 S. LaBrea, Los Angeles 16, Calif.—PA, PC, PE, PM, PR, PT, PS, PP, PQ
American Television & Radio Co., 300 E. 4th St., St. Paul 1, Minn.—PS, PP
ARF Products, Inc., 7627 Lake St., River Forest, Ill.—PM
Automatic Electric Sales, 1033 W. Van Buren St., Chicago 7, Ill.—PM, PR, PT
Barry Corp., 179 Sidney St., Cambridge 39, Mass.—PZ
Beta Electric Corp., 1762 3rd Ave., New York 29, N. Y.—PS
Bliley Electric Co., Union Station Bldg., Erie, Pa.—PX
Breon Laboratories, 1520 Evergreen Rd., Williamsport, Pa.—PX
Browning Laboratories, Inc., 750 Main St., Winchester, Mass.—PS
Capehart-Farnsworth Corp., 3700 Pontiac St., Ft. Wayne 1, Ind.—PM
Carter Motor Co., 2644 N. Maplewood Ave., Chicago 47, Ill.—PS
CGS Laboratories, 36 Ludlow St., Stamford, Conn.—PM, PS
Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—PC
Clarke Instrument Corp., 910 King St., Silver Spring, Md.—PA, PR
Clear Beam Antennas, 618 N. LaBrea, Los Angeles 36, Calif.—PA
Communication Devices Co., 2331 12th Ave., New York 27, N. Y.—PE, PR, PT, PQ, PF
Communications Co., 300 Greco Ave., Coral Gables, Fla.—PR, PT
Cornell-Dubilier Electric Corp., Indianapolis Div., 2900 Columbia Ave., Indianapolis 20, Ind.—PA, PS, PP
Corvek Corp., 1005 N. W. 16 St., Portland 9, Ore.—PA, PS
Crest Transformer Corp., 1834 W. North Ave., Chicago 22, Ill.—PS
Crystal Research Laboratories, 29 Allyn St., Hartford, Conn.—PX
Dalmo Victor Co., 1414 El Camino Real, San Carlos, Calif.—PA, PM
Dayton Airadio, Inc., P. O. Box 167, Vandalia, Ohio—PS, PV
Doolittle Radio Inc., 7421 S. Loomis Blvd., Chicago 36, Ill.—PR, PT, PF
DuMont Laboratories Inc., Allen B., 1000 Main Ave., Clifton, N. J.—PA, PC, PE, PM, PR, PT, PS, PP, PV, PK
Eidson Electronic Co., P. O. Box 31, Temple, Texas—PX
Electronic Instrument Co., 276 Newport St., Brooklyn 12, N. Y.—PX
Electronic Research & Mfg. Corp., 1420 E. 25 St., Cleveland 14, Ohio—PE, PR, PT, PS, PF
Electronic Transformer Co., 207 W. 25 St., New York 1, N. Y.—PS, PP
Elm Laboratories, 18 S. Broadway, Dobbs Ferry, N. Y.—PR
Erco Radio Laboratories, Stewart Ave. E., Garden City, L. I., N. Y.—PR, PT, PF
Federal Telecommunication Laboratories, 500 Washington Ave., Nutley 10, N. J.—PM
Federal Telephone & Radio Corp., 100 Kingsland Rd., Clifton, N. J.—PC, PM, PR, PT, PS, PF, PV
Furst Electronics, 12 S. Jefferson St., Chicago 6, Ill.—PS, PP
Gates Radio Co., Quincy, Ill.—PC, PX, PE, PR, PS, PP, PQ, PF, PA
Gaveco Laboratories, 2 East End Ave., New York 21, N. Y.—PS, PP
General Electric Co., Electronics Dept., Syracuse, N. Y.—PA, PC, PX, PE, PM, PR, PT, PS, PP, PF, PV, PK
Grady Instrument Co., 689 Belmont St., Belmont 78, Mass.—PA, PM, PR, PT, PS, PP, PQ, PF
Gulton Mfg. Corp., Metuchen, N. J.—PX
Hamilton Electronics, 2726 Pratt Ave., Chicago 45, Ill.—PC, PS
Hamilton Kent Mfg. Co., Kent, Ohio—PZ
Heyman Mfg. Co., 500 Michigan Ave., Kenilworth, N. J.—PX
Highland Engineering Co., 32 Holman Blvd., Hicksville, L. I., N. Y.—PS
Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—PM, PR, PT, PS, PP, PQ, PF
Hughey & Phillips, 326 N. LaCienega Blvd., Los Angeles 48, Calif.—PE, PQ, PF, PV
Hunt Corp., 453 Lincoln St., Carlisle, Pa.—PX
Industrial Transformer Corp., Gouldsboro, Pa.—PS
Jamaica Television Mfg. Co., 95-26 Sutphin Blvd., Jamaica 4, L. I., N. Y.—PS, PV
James Knights Co., 101 E. Church St., Sandwich, Ill.—PX
Jones Electronics Co., M. C., 96 N. Main St., Bristol, Conn.—PE
Kalbfell Laboratories, 1076 Morena Blvd., San Diego 10, Calif.—PR
Kepco Laboratories, 149-14 41 St., Flushing, L. I., N. Y.—PS, PP
Kings Electronics Co., 811 Lexington Ave., Brooklyn 21, N. Y.—PM
Korfund Co., 48-15 32nd Pl., Long Island City 1, N. Y.—PZ

1. BECAUSE the MAGNETIC-HYDRAULIC TIME DELAY retards the trip unit in time inverse to the magnitude of the current, allowing passage of inrush current, but causing instantaneous breaking of the circuit on excessive overload or short circuit.

2. BECAUSE the HIGH SPEED LATCH operates with minimum friction and maximum speed. It functions only under overload or short circuit, but it does that even if handle is held in "ON" position during overload. Rotation of latch releases contacts which are under heavy spring pressure.

3. BECAUSE the HIGH SPEED BLOWOUT, through magnetic action, gives instant arc interruption. The blowout contacts are separated from each other by means of individual arcing chambers. The higher the current, the greater is the quenching effect, due to the intensification of the magnetic field.

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Link Radio Corp., 125 W. 17 St., New York, N. Y.—PE, PR, PT, PS, PP, PQ, PF, PA, PM
Lord Mfg Co., 1635 W. 12th St., Erie, Pa.—PZ
Micro Engineering Corp., 15 E. Tujunga Ave., Burbank Calif.—PM
Microwave Equipment Co., Greenbrook Rd., Caldwell N. J.—PM
Millen Mfg. Co., James, 150 Exchange St., Malden 48, Mass.—PS
Modulation Products Co., 92 East End Ave., New York, N. Y.—PR, PT, PS, PP, PQ, PF, PV
Motorola, Inc., 4545 Augusta Blvd., Chicago 51, Ill.—PA, PM, PR, PT, PF
Nebel Laboratory, R. E., 1104 Lincoln Pl., Brooklyn 13, N. Y.—PX
Neptune Electronics Co., 433 Broadway, New York 13, N. Y.—PS, PP
Onan & Sons, D. W., 43 Royalston Ave. N., Minneapolis 5, Minn.—PP
Peek, Inc., Walter E., 2842 W. 30 St., Indianapolis 22, Ind.—PA
Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.—PA, PE, PM, PR, PT, PS, PQ, PF, PV
Piezo Products Co., Whitney St., Framington, Mass.—PX
Polarad Electronics Corp., 100 Metropolitan Ave., Brooklyn 11, N. Y.—PS
Precision Piezo Service, 427 Mayflower St., Baton Rouge, La.—PX
Precision Products, Inc., 719 17 St., N. W., Washington, D. C.—PX
Premax Products Div., Chisholm-Ryder Co., Highland & College Aves., Niagara Falls, N. Y.—PA
Product Development Co., 526 Elm St., Arlington, N. J.—PA, PE
Radio Corp. of America, RCA-Victor Div., Camden, N. J.—PA, PC, PX, PE, PM, PR, PT, PS, PP, PQ, PF, PV, PK
Radio Engineering Laboratories, 36-40 37 St., Long Island City 1, N. Y.—PA, PM, PR, PF
Radio Specialty Mfg. Co., 2023 S. E. Sixth Ave., Portland 14, Ore.—PX
Ram Electronics, Inc., S. Buckhout St., Irvington N. Y.—PP
Raytheon Mfg. Co., 138 River St., Waltham, Mass.—PC, PX, PE, PM, PR, PT, PS, PP, PQ, PF, PV, PA
Ready-Power Co., 11231 Freud Ave., Detroit 14, Mich.—PS, PP
Reeves-Hoffman Corp., 321 Cherry St., Carlisle, Pa.—PC, PX, PQ, PF, PV
Robinson Aviation, Inc., Teterboro Air Terminal, Teterboro, N. J.—PZ
Sierra Electronic Corp., P. O. Box 346, San Carlos, Calif.—PS, PQ, PF
Silver Co. Inc., McMurdo, 1249 Main St., Hartford 3, Conn.—PR, PT, PQ
Sperry Gyroscope Co. Div., Sperry Corp., Great Neck, L. I., N. Y.—PM, PS
Standard Electronic Research Corp., 2 East End Ave., New York 21, N. Y.—PM, PR, PT
Standard Electronics Corp., 25 W. 43 St., New York 18, N. Y.—PC, PX, PE
Standard Piezo Co., P. O. Box 164, Carlisle, Pa.—PX
Taffet Radio & Television Co., 2530 Belmont Ave., New York 58, N. Y.—PR, PT
Tech Laboratories, Inc., Bergen & Edsall Blvds., Palisades Park, N. J.—PE
Technical Appliance Corp., Sherburne, N. Y.—PA
Telectro Industries Corp., 35-16 37th St., Long Island City 1, N. Y.—PE, PM, PR, PT, PS, PP
Telrex, Inc., Neptune Highway, Asbury Park, N. J.—PA
Thordarson Electric Mfg. Div., Maguire Industries Inc., 500 W. Huron St., Chicago 10, Ill.—PS
Titeflex, Inc., 500 Frelinghuysen Ave., Newark 5, N. J.—PM
Transmitter Equipment Mfg. Co., 345 Hudson St., New York 14, N. Y.—PQ
Trio Mfg. Co., Griggsville, Ill.—PA
U. S. Recording Co., 1121 Vermont Ave., N. W., Washington 5, D. C.—PC, PS, PP
Warren Mfg. Co., 256 East St., E. Haven, Conn.—PA
Webster Electric Co., Clark & DeKoven Aves., Racine, Wisc.—PX
Willard Storage Battery Co., 246 E. 131 St., Cleveland 1, Ohio—PP
Workshop Associates, 66 Needham St., Newton Highlands 61, Mass.—PA

TV INVESTMENT, JUNE, 1950

106 TV stations	$ 53,000,000
Coaxial cables, radio links	50,000,000
Manufacturers' plants	150,000,000
Patents, research	50,000,000
TV dealers, distributors	300,000,000
TV services	100,000,000
7,000,000 TV sets, incl. installations, repairs	2,800,000,000
Total	$3,503,000,000

3—Police, Industrial, Common Carrier, Marine, Railroad, Public Safety

Auto alarms	MU
Atennas	MA
Crystals	MX
Control equipment	MC
Microphones	MB
Vibration mountings	MZ
Receivers, fixed	MR
Receivers, mobile	MM
Pack sets	MS
Power supplies	MP
Power supplies, emergency	ME
Intercom systems	MI
Transmitters	MT
Transceivers	MV
Walkie Talkies	MW

Accurate Engineering Co., 2005 Blue Island Ave., Chicago 8, Ill.—MP, ME
Aeronautical Communications Equip., 3090 Douglas Rd., Miami 33, Fla.—MR, MM, MT
Air Associates, Inc., Teterboro, N. J.,—MA, MR, MM, MP, MT, MI, MC, MW, MS, MU, MV
Alpar Mfg. Co., 466 St. Francis St., Redwood City, Calif.—MA
American Communications Corp., 306 Broadway, New York 7, N. Y.—MR, MM, MP, ME, MI, MC
American Electroneering Co., 2112 S. LaBrea, Los Angeles 16, Calif.—MR, MM, MP, ME, MC, MS, MV
American Television & Radio Co., 300 E. 4th St., St. Paul 1, Minn.—MP, ME
Andrew Corp., 363 E. 75 St., Chicago 19, Ill.—MA
Applied Science Corp., P. O. Box 44, Princeton, N. J.—MT, MC
ARF Products, Inc., 7627 Lake St., River Forest, Ill.—MR, MM, MP, ME, MT, MC, MV
Atlas Sound Corp., 1449 39th St., Brooklyn 18, N. Y.—MI
Audio Communication Mfg. Co., 200 Kosciuska St., Brooklyn 16, N. Y.—MI
Automatic Electric Sales, 1033 W. Van Buren St., Chicago 7, Ill.—MR, MM, MI
Barry Corp., 179 Sidney St., Cambridge 39, Mass.—MZ
Barker & Williamson, Inc., 237 Fairfield Ave., Upper Darby, Pa.—MR, MM, MC, MW, MS, MV
Bassett Inc. Rex, 311 N. W. First Ave., Ft. Lauderdale, Fla.—MX
Bendix Aviation Corp., Red Bank Div., Red Bank, N. J.—MP
Beta Electric Corp., 1762 3rd Ave., New York 29, N. Y.—MP
Bliley Electric Co., Union Station Bldg., Erie, Pa.—MX
Boehme Inc., H. O., 915 Broadway, New York 10, N. Y.—MC
Booth Co., Arthur E., 4124 Beverly Blvd., Los Angeles 4, Calif.—MP
Brelco Electronics Corp., 55 Vandam St., New York 13, N. Y.—MR, MM, MU
Breon Laboratories, 1520 Evergreen Rd., Williamsport, Pa.—MX
Buggie & Co., H. H., Madison Ave. & 22nd St., Toledo 1, Ohio—MA
Bunnell & Co., J. H., 81 Prospect St., Brooklyn 1, N. Y.—MR, MM, MP, ME, MT, MC
Burnett Radio Laboratory, Wm. W. L., 4814 Idaho St., San Diego 16, Calif.—MX
Burton-Rogers Co., 292 Main St., Cambridge, 42 Mass.—MA
Capehart-Farnsworth Corp., 3700 Pontiac St., Ft. Wayne 1, Ind.—MA, MM, MP, MT
Carter Motor Co., 2644 N. Maplewood Ave., Chicago 47, Ill.—MP.
Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—MP
Clarke Instrument Corp., 910 King St., Silver Spring, Md.—MR
Clear Beam Antennas, 618 N. LaBrea, Los Angeles 36, Calif.—MA
Collins Radio Co., 855 35th St., N. E., Cedar Rapids, Iowa—MX, MR, MT, MC
Commercial Radio Equipment Co., International Bldg., Washington, D. C.—MX
Communication Devices Co., 2331 12th Ave., New York 27, N. Y.—MR, MM, MP, ME, MT, MI, MW, MS, MU, MV
Communications Co., 300 Greco Ave., Coral Gables, Fla.—MA, MR, MM, MT, MW, MV
Conn Telephone & Electric Corp., 70 Brittania St., Meriden, Conn.—MI
Cooper Electronic Products Co., 5106 Frankford Ave., Philadelphia 24, Pa.—MI
Cornell-Dubilier Electric Corp., Indianapolis Div., 2900 Columbia Ave., Indianapolis, Ind.—MA, MP, ME
Corvek Corp., 1005 N. W. 16 St., Portland 9, Ore—MA, MP, MV
Crest Transformer Corp., 1834 W. North Ave., Chicago 22, Ill.—MP, ME
Crystal Research Laboratories, 29 Allyn St., Hartford, Conn.—MX
Custom Craft Mfg. Co., 256 E. 98 St., Brooklyn 12, N. Y.—MP, MI, MC
Dalmo Victor Co., 1414 El Camino Real, San Carlos, Calif.—MI
Dielectric Products Co., 125 Virginia Ave., Jersey City 5, N. J.—MA
Doolittle Radio, Inc., 7421 S. Loomis Blvd., Chicago 36, Ill.—MA, MR, MM, MP, ME, MT, MC, MW, MS, MV
Eckstein Radio & Television Co., LeRoy, Minn.—MM
Eidson Electronic Co., P.O. Box 31, Temple, Texas—MX
Electric Specialty Co., 211 South St., Stamford, Conn.—MP
Electronic Instrument Co., 276 Newport St., Brooklyn 12, N. Y.—MX
Electronic Research & Mfg. Corp., 1420 E. 25 St., Cleveland 14, Ohio—MR, MM, MP, ME, MT, MC, MV
Electronic Transformer Co., 207 W. 25 St., New York 1, N. Y.—MP, ME
Electronics Contracting Co., 122 Chambers St., New York 7, N. Y.—MV
Electro Sales Co., Inc., 399 Atlantic Ave., Boston 10, Mass.—MP
Elm Laboratories, 18 S. Broadway, Dobbs Ferry, N. Y.—MI
Eltron, Inc., 407 N. Jackson St., Jackson, Mich.—MP, MC
Erco Radio Laboratories, Stewart Ave., E., Garden City, L. I., N. Y.—MA, MR, MM, MP, MT, MC
Executone, Inc., 415 Lexington Ave., New York 17, N. Y.—MI
Farmers Eng'g & Mfg. Co., 549 Brushton Ave., Pittsburgh 21, Pa.—MI, MC, MV
Federal Telephone & Radio Corp., 100 Kirgsland Rd., Clifton, N. J.—MA, MR, MM, MT, MC, MV
Fisher Research Labs., 1961 University Ave., Palo Alto, Calif.—MV, MM, MT, MR, MW
Gates Radio Co., Quincy, Ill.—MX, MR, MP, ME, MT
Gaveco Laboratories, 2 East End Ave., New York 21, N. Y.—MP, ME, MC
General Electric Co., Electronics Dept., Syracuse, N. Y.—MA, MX, MR, MM, MP, ME, MT, MI, MC, MV
Godfrey Mfg. Co., 171 S. 2nd St., Milwaukee 4, Wisc.—MI
Grady Instrument Co., 689 Belmont St., Belmont 78, Mass.—MA, MX, MM, MP, MT, MC, MW, MS, MR
Gray Radio Co., 501 Forest Hill Blvd., W. Palm Beach, Fla.—MM, MT
Gulton Mfg. Corp., Metuchen, N. J.—MX, MV
Hallicrafters Co., 4401 W. Fifth Ave., Chicago 24, Ill.—MR, MM
Hamilton Electronics, 2726 Pratt Ave., Chicago 45, Ill.—MP, ME, MI, MC
Hamilton Kent Mfg. Co., Kent, Ohio, MZ
Harvey Radio Co., 103 W. 43rd St., New York 18, N. Y.—MT
Harvey Radio Laboratories, 447 Concord Ave., Cambridge 38, Mass.—MA, MX, MR, MM, MP, MT, MC, MV
Hastings Instrument Co., Box 1275 Wythe Branch, Hampton, Va.—MC
Heyman Mfg. Co., 500 Michigan Ave., Kenilworth, N. J.—MX
Highland Engineering Co., 32 Holman Blvd., Hicksville, L. I., N. Y.—MP
Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—MA, MR, MM, MP, ME, MT, MI, MC, MW, MS, MU, MV
Hudson American Corp., 25 W. 43 St., New York 18, N. Y.—MA, MX, MR, MM, MT
Hughey & Phillips, 326 N. LaCienega Blvd., Los Angeles 48, Calif.—MA
Hunt Corp., 453 Lincoln St., Carlisle, Pa—MX
Industrial Electronics, 2457 Woodward Ave., Detroit 1, MP
Industrial Transformer Corp., Gouldsboro, Pa.—MP
Intercall Systems, Inc., 10 Norwood Ave., Dayton 1, Ohio—MI
Intervox Corp., 2701 Calif. Ave., Seattle 6, Wash.—MR, MM, MP, MT, MV
Ionic Equipment Co., 1705 N. Kenmore, Los Angeles 27, Calif.—MC
Jamaica Television Mfg. Co., 95-26 Sutphin Blvd., Jamaica 4, L. I., N. Y.—MA, MR, MT, MV
James Knights Co., 101 E. Church St., Sandwich, Ill.—MX
Jefferson Inc, Ray, 40 E. Merrick Rd., Freeport, L. I., N. Y.—MA, MX, MM, MT, MV
Kaar Engineering Co., 2995 Middlefield Rd., Palo Alto, Calif.—MA, MX, MR, MM, MT, MC
Kalbfell Laboratories, 1076 Morena Blvd., San Diego 10, Calif.—MR
Kellogg Switchboard & Supply Co., 6650 S. Cicero Ave., Chicago 38, Ill.—MI
Kepco Laboratories, 149-14 41st Ave., Flushing, L. I., N. Y.—MP, ME
Korfund Co., 48-15 32 Pl. Long Island City 1, N. Y.—MZ
Lake Mfg. Co., 2323 Chestnut St., Oakland 7, Calif.—MI
Lambda Electronics Corp., 103-02 Northern Blvd., Corona, L. I., N. Y.—MP
Laurehk Radio Mfg. Co., 3927 Monroe Ave., Wayne, Mich.—MR, MM
Lingo & Son Inc., John E., 2814 Buren Ave., Camden 5, N. J.—MA
Link Radio Corp., 125 W. 17 St., New York, N. Y.—MR, MM, MP, MT, MV, MA, MX, ME, MI, MC, MW, MS, MU, MV
Loge, J. M., 2171 W. Washington Blvd., Los Angeles 7, Calif.—MI
Lord Mfg. Co., 1635 W. 12 St., Erie, Pa.—MZ
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Miller Laboratories, August E., 9226 Hudson Blvd., N. Bergen, N. J.—MX
Minnesota Electronics Corp., 97 E. 5th St., St. Paul 1, Minn.—MC
Mitchell Industries, Camp Wolters, Mineral Wells, Texas—MM, MV
Modulation Products Co., 92 East End Ave., New York, N. Y.—MR, MM, MP, ME, MT, MI, MC, MW, MS, MV
Monitor Products Co., 815 Fremont Ave., S. Pasadena, Calif.—MX
Motorola, Inc., 4545 Augusta Blvd., Chicago 51, Ill.—MA, MX, MR, MM, MP, ME, MT, MI, MC, MW, MS, MU
National Inter-Communicating Systems, 1531 Devon Ave., Chicago 26, Ill.—MI, MP
Nebel Laboratory, R. E., 1104 Lincoln Pl., Brooklyn 13, N. Y.—MX
Neptune Electronics Co., 433 Broadway, New York 13, N. Y.—MP, ME, MI, MC
Network Mfg Corp., 213 W. 5th St., Bayonne, N. J.—MA, MR, MP, MT
Northern Radio Co., 134 Bell St., Seattle 1, Wash.—MR, MM, MT, MN
Onan & Sons, D. W., 43 Royalston Ave. N., Minneapolis 5, Minn.—ME
Pearce-Simpson, Inc., 3195 S. W. 18th St., Miami 35, Fla.—MA, MR, MM, MP, ME, MT, MW
Peek Inc., Walter E., 2842 W. 30 St., Indianapolis 22, Ind.—MA
Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.—MA, MX, MR, MM, MP, ME, MT, MC
Piezo Products Co., Whitney St., Framingham, Mass.—MX
Precision Piezo Service, 427 Mayflower St., Baton Rouge, La.—MX
Precision Products, Inc., 719-17 St. N. W., Washington, D. C.—MX
Premax Products Div., Chisholm-Ryder Co., Highland & College Aves., Niagara Falls, N. Y.—MA
Press Wireless Mfg. Co., Cantiague Rd., Hicksville, L. I., N. Y.—MR, MP, MT, MC
Radio Apparatus Corp., 303 Fountain Sq. Theatre Bldg., Indianapolis 3, Ind.—MA, MR, MM
Radio Corp. of America, RCA-Victor Div., Camden, N. J.—MA, MX, MR, MM, MP, ME, MT, MI, MC, MW, MS, MV
Radio Engineering Laboratories, 36-40 37 St., Long Island City 1, N. Y.—MA, MM, MT
Radiomarine Corp., of America, 75 Varick St., New York 13, N. Y.—MR, MM, MP, ME, MT, MC, MW, MS, MU, MV
Radio Specialty Mfg. Co., 2023 S. E. Sixth Ave., Portland 14, Ore.—MA, MX, MR, MM, MP, MT, MC, MW, MS, MV
Radio Transceiver Laboratories, 116-23 Jamaica Ave., Richmond Hill 18, L. I., N. Y.—MM, MT, MW, MS, MV
Raytheon Mfg. Co., 138 River St., Waltham, Mass.—MA, MX, MR, MM, MP, ME, MT, MC, MV, MW
Ready-Power Co., 11231 Freud Ave., Detroit 14, Mich. MP, ME
Reeves-Hoffman Corp., 321 Cherry St., Carlisle, Pa.—MX
Roanwell Corp., 662 Pacific St., Brooklyn 17, N. Y.—MI, MC, MB
Robinson Aviation, Inc., Teterboro Air Terminal, Teterboro, N. J.—MZ
Sargent-Rayment Co., 212 9th St., Oakland 7, Calif.—MR
Schuttig & Co., 9th & Kearny Sts., N. E., Washington 17, D. C.—MA, MP, MT, MC, MV, MR
Scientific Radio Products Co., 738 W. Broadway, Council Bluffs, Iowa—MX
Scientific Radio Service, 4301 Sheridan St., University Pk., Hyattsville, Md.—MX
Sierra Electronic Corp., P. O. Box 346, San Carlos, Calif.—MP
Silver Co. Inc., McMurdo, 1249 Main St., Hartford 3, Conn.—MR, MM, MT
Simpson Mfg. Co., Mark, 32-28 49 St., Long Island City, N. Y.—MI
Sonar Radio Corp., 59 Myrtle Ave., Brooklyn 1, N. Y. —MT
Sonotone Corp., Elmsford, N. —MB
Spellman Television Co., 3029 Webster Ave., Bronx, N. Y.—MP
Standard Electronic Research Corp., 2 East End Ave., New York 21, N. Y.—MV
Standard Electronics Corp., 25 W. 43 St., New York 18, N. Y.—MX
Standard Piezo Co., P. O. Box 164, Carlisle, Pa.—MX
Suburban Radio Co., 158 Central Ave., Rochelle Park, N. J.—MR, MM, MP, ME, MT, MI, MC, MW, MS, MU, MV
Talk-A-Phone Co., 1512 S. Pulaski Rd., Chicago 23, Ill.—MI
Telectro Industries Corp., 35-16 37th St., Long Island City 1, N. Y.—MR, MM, MP, ME, MI, MC, MW, MS, MU, MV
Telemark, Inc., 100 Greyrock Pl., Stamford, Conn.—MR, MM
Telrex Inc., Neptune Highway, Asbury Park, N. J.—MA
Thordarson Electric Mfg. Div., Maguire Industries Inc., 500 W. Huron St., Chicago 10, Ill.—MP, ME
Transmitter Equipment Mfg. Co., 345 Hudson St., New York 14, N. Y.—MM, MP, MT, MC, MW, MS
U. S. Motors Corp., 584 Nebraska St., Oshkosh, Wisc. —ME
U. S. Recording Co., 1121 Vermont Ave., N. W., Washington 5, D. C.—MI, MC
University Loudspeakers, Inc, 80 S. Kensico Ave., White Plains, N. Y.—MI
Valpey Crystal Corp., 1244 Highland St., Holliston, Mass.—MX
Warren Mfg. Co., 250 East St., E. Haven, Conn.—MA
Webster Electric Co., Clark & DeKoven Aves. Racine, Wisc.—MI
West Coast Electronics Co., 1601 S. Burlington Ave., Los Angeles 6, Calif.—MV, MR, MM, MT
Western Sound & Electric Laboratories, 805 S. Fifth St., Milwaukee, Wisc.—MI
Westinghouse Electric Corp., Construction & Communications Sec. 10L-E. Pittsburgh, Pa.—MR, MM, MP, MT
Westline Electronics Co., 11660 Olympic Blvd., Los Angeles 25, Calif.—MX
Wheeler Insulated Wire Co., 150 E. Aurora St., Waterbury 20, Conn.—MI
Wilcox Electric Co., 14 and Chestnut St., Kansas City, Mo.—MR, MM, MX, MP, MT
Williams Ship Radio Co., 4366 Mentone St., San Diego, Calif.—MT
Winslow Co., 9 Liberty St., Newark 5, N. J.—MI. MC
Workshop Associates, 66 Needham St., Newton Highlands 61, Mass.—MA

4—Aviation

Airborne film recorder ..... AK
Airborne wire recorder ..... AD
Airport controller recorder ..... AB
Antennas ..... AA
Crystals ..... AC
Emergency equipment ..... AX
Intercom systems ..... AI
Landing system, airborne ..... AL
Landing system, ground ..... AS
Navigation equipment, airborne ..... AN
Navigation equipment, ground ..... AG
Power supplies ..... AP
Power supplies, emergency ..... AE
Power supplies, 400 CPS ..... AW
Radar ..... AR
Radio altimeters ..... AH
Receivers, fixed ..... AF
Receivers, mobile ..... AM
Test equipment ..... AV
Vibration mountings ..... AZ

Accurate Engineering Co., 2005 Blue Island Ave., Chicago 8, Ill.—AP, AE
Air Associates, Inc., Teterboro, N. J.—AF, AM, AP, AT, AH, AN, AG, AI, AL, AS
Airborne Instruments Lab., 160 Old County Rd., Mineola, N. Y.—AR, AH, AW, AV, AN, AG, AL, AS
Aircraft Radio Corp., Boonton, N. J.—AV, AM, AT, AN, AS
Airlectron Inc., 295 Bloomfield Ave., Caldwell, N. J.—AI
Airplane & Marine Instruments, Box 92, Clearfield, Pa. —AT
Allison Radar, Albuquerque, N. Mex.—AN
American Communications Corp., 306 Broadway, New York 7, N. Y.—AF, AP, AT
American Electroneering Co., 2112 S. La Brea, Los Angeles 16, Calif.—AF, AM, AP, AE, AT, AR, AH, AN, AL, AS, AX, AV
American Television & Radio Co., 300 E. 4th St., St. Paul 1, Minn.—AP, AE
Amplifier Corp. of America, 398 Broadway, New York 12, N. Y.—AB
A.R.F. Products, Inc., 7627 Lake St., River Forest, Ill.—AF, AM, AP, AE, AT, AR
Barry Corp., 179 Sidney St., Cambridge 39, Mass.—AZ
Bassett Inc., Rex, 311 N. W. First Ave., Ft. Lauderdale, Fla.—AC
Bendix Aviation Corp., Pacific Div., 11600 Sherman way, N. Hollywood, Calif.—AF, AM, AT, AN, AG, AR
Bendix Aviation Corp., Red Bank Div., Red Bank, N. J. —AP
Bendix Aviation Corp., Eclipse Pioneer Div., Teterboro, N. J.—AN
Beta Electric Corp., 1762 3rd Ave., New York 29, N. Y. —AP
Bliley Electric Co., Union Station Bldg., Erie, Pa.—AC
Boehme Inc., H. O., 915 Broadway, New York 10, N. Y. —AG
Booth Co., Arthur E., 4124 Beverly Blvd., Los Angeles 4, Calif.—AP
Breon Laboratories, 1520 Evergreen Rd., Williamsport, Pa.—AC
Brush Development Co., 3405 Perkins Ave., Cleveland 14, Ohio—AB
Bunnell & Co., J. H., 81 Prospect St., Brooklyn 1, N. Y.—AF, AM, AP, AE, AT, AR, AH, AG, AS
Burnett Radio Laboratory, Wm. W. L., 4814 Idaho St., San Diego 16, Calif.—AC
Canoga Corp., 14315 Bessemer, Van Nuys, Calif.—AR
Clear Beam Antennas, 618 N. La Brea, Los Angeles 36, Calif.—AA
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Commercial Radio Equipment Co., International Bldg., Washington, D. C.—AC
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Cornell-Dubilier Electric Corp., Indianapolis Div., 2900 Columbia Ave., Indianapolis 20, Ind.—AA, AP, AE
Corvek Corp., 1005 N. W. 16 St., Portland 9, Ore.—AA
Crest Transformer Corp., 1834 W. North Ave., Chicago 22, Ill.—AP, AE
Crystal Research Laboratories, 29 Allyn St., Hartford, Conn.—AC
Dallons Laboratories, 5066 Santa Monica Blvd., Los Angeles 27, Calif.—AC
Dalmo Victor Co., 1414 El Camino Real, San Carlos, Calif.—AA, AR, AN, AI, AL, AS
Dayton Airadio, Inc., P. O. Box 167, Vandalia, Ohio—AA, AF, AM, AP, AT, AI
Eckstein Radio & Television Co., Le Roy, Minn.—AM
Eidson Electronic Co., P. O. Box 31, Temple, Texas, —AC
Electronic Associates, Inc., Long Branch, N. J.—AT, AR
Electronic Instrument Co., 276 Newport St., Brooklyn 12, N. Y.—AC
Electronic Measurements Co., Box 850, Red Bank, N. J., —AP, AE, AT
Electronic Transformer Co., 207 W. 25th St., New York 1, N. Y.—AP, AE
Electro Sales Co., Inc., 399 Atlantic Ave., Boston 10, Mass.—AA, AF, AM, AP, AE, AT, AR, AH, AI
Elm Laboratories, 18 S. Broadway, Dobbs Ferry, N. Y. —AI
Erco Radio Laboratories, Stewart Ave., E., Garden City, L. I., N. Y.—AF, AM, AP, AT, AS
Executone Inc., 415 Lexington Ave., New York 17, N. Y.—AI
Federal Telecommunication Laboratories, 500 Washington Ave., Nutley 10, N. J.—AA, AF, AM, AT, AR, AN, AG, AL, AS
Federal Telephone & Radio Corp., 100 Kingsland Rd., Clifton, N. J.—AF, AM, AP, AT, AR, AN, AG, AL, AS
Flader, Inc., Frederic, 583 Division St., N. Tonawanda, N. Y.—AA, AP, AE, AN
Gaveco Laboratories, 2 East End Ave., New York 21, N. Y.—AP, AE
General Electric Co., Electronics Dept., Syracuse, N. Y. —AA, AC, AM, AP, AE, AT, AR, AN, AG, AL, AS
Gertsch Products, Inc., 11846 Mississippi Ave., Los Angeles 25, Calif.—AM
Gilfillan Bros., 1815 Venice Blvd., Los Angeles 6, Calif. —AR, AN, AG, AL, AS
Gulton Mfg. Corp., Metuchen, N. J.—AC
Hallicrafters Co., 4401 W. Fifth Ave., Chicago 24, Ill. —AF, AM
Hamilton Electronics, 2726 Pratt Ave., Chicago 45, Ill.—AP, AE, AI
Hamilton Kent Mfg. Co., Kent, Ohio—AZ
Hart & Co., Frederick, 837 Main St., Poughkeepsie, N. Y.—AK, AD, AA
Harvey Radio Co., 103 W. 43rd St., New York 18, N. Y.—AT
Harvey Radio Laboratories, 447 Concord Ave., Cambridge 38, Mass.—AA
Harvey-Wells Electronics, Inc., North St., Southbridge, Mass.—AT, AN, AI
Hastings Instrument Co., Box 1275, Wythe Branch, Hampton, Va.—AN, AG
Heyman Mfg. Co., 500 Michigan Ave., Kenilworth, N. J. —AC
Highland Engineering Co., 32 Holman Blvd., Hicksville, L. I., N. Y.—AP
Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—AA, AF, AM, AP, AE, AT, AR, AH, AN, AG, AI, AL, AS, AX
Houston-Fearless Corp., W. Los Angeles 64, Calif.—AR
Hughey & Phillips, 326 N. La Cienega Blvd., Los Angeles 48, Calif.—AA, AG
Hunt Corp., 453 Lincoln St., Carlisle, Pa.—AC
Industrial Transformer Corp., Gouldsboro, Pa.—AP
James Knights Co., 101 E. Church St., Sandwich, Ill. —AC
Kaar Engineering Co., 2995 Middlefield Rd., Palo Alto, Calif.—AC, AF
Kepco Laboratories, 149-14 41st Ave., Flushing, L. I., N. Y.—AP, AE
Korfund Co., 48-15 32nd Pl., Long Island City 1, N. Y. —AZ
Lake Mfg. Co., 2323 Chestnut St., Oakland 7, Calif. —AI
Lear, Inc., 110 Ionia Ave., N. W., Grand Rapids 2, Mich.—AF, AM, AT, AV, AN, AI
Leru Laboratories, 360 Bleecker St., New York 14, N. Y. —AR
Liberty Electronics Inc., 135 Liberty St., New York 6, N. Y.—AC, AE, AR
Lingo & Son, John E., 2814 Buren Ave., Camden 5, N. J.—AA
Link Aviation, Binghamton, N. Y.—AG, AS
Lord Mfg. Co., 1635 W. 12th St., Erie, Pa.—AZ
Maryland Electronic Mfg. Corp., 5009 Calvert Rd., College Park, Md.—AG, AS
Microwave Equipment Co., Greenbrook Rd., Caldwell, N. J.—AR
Miles Reproducer Co., 812 Broadway, New York 3, N. Y.—AB
Millen Mfg. Co., 150 Exchange St., Malden 48, Mass. —AP
Miller Laboratories, August E., 9226 Hudson Blvd., N. Bergen, N. J.—AC
Mitchell Industries, Camp Wolters, Mineral Wells, Texas—AA, AF, AM, AT, AN
Modulation Products Co., 92 East End Ave., New York, N. Y.—AF, AM, AP, AE, AT
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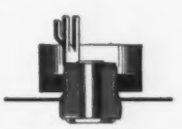

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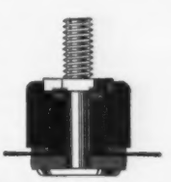

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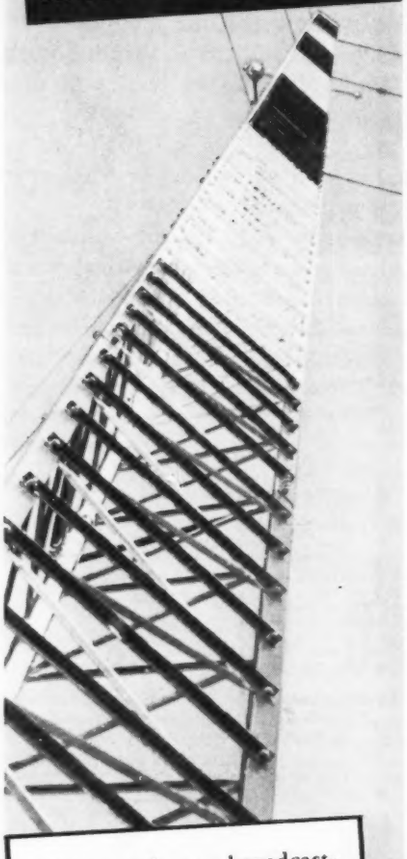

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Tower and Antenna Division

WIND TURBINE CO.

West Chester Pennsylvania

TRYLON LADDER TOWERS

Motoresearch Co., 1600 Junction Ave., Racine, Wisc.—AW
National Aeronautical Corp., Wing's Field, Ambler, Pa.—AA, AF, AM, AP, AT, AV, AN, AL, AX
National Electronics Laboratories, 1713 Kalorama Rd., N. W., Washington 9, D. C.—AF, AM, AP, AT, AG
Nebel Laboratory, R. E., 1104 Lincoln Pl., Brooklyn 13, N. Y.—AC
Neptune Electronics Co., 433 Broadway, New York 13, N. Y.—AP, AE, AN, AI
Network Mfg. Corp., 213 W. 5th St., Bayonne, N. J.—AA, AP, AR, AI
Onan & Sons, D. W., 43 Royalston Ave. N., Minneapolis 5, Minn.—AE
Peerless Products Industries, 812 N. Pulaski Rd., Chicago 51, Ill.—AA
Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.—AR, AN, AT
Piezo Products Co., Whitney St., Framingham, Mass.—AC
Precision Piezo Service, 427 Mayflower St., Baton Rouge, La.—AC
Precision Products, Inc., 719 17 St., N. W., Washington, D. C.—AC, AN, AG
Premax Products Div. Chisholm-Ryder Co., Highland & College Aves., Niagara Falls, N. Y.—AA
Press Wireless Mfg. Co., Cantiague Rd., Hicksville, L. I., N. Y.—AF, AT, AR, AG
Product Development Co., 526 Elm St., Arlington, N. J.—AA
Radiomarine Corp. of America, 75 Varick St., New York 13, N. Y.—AG, AS, AX
Radio Receptor Co., 84 N. 9th St., Brooklyn 11, N. Y.—AF, AT
Radio Specialty Mfg. Co., 2023 S. E. Sixth Ave., Portland 14, Ore.—AC
Radio Transceiver Laboratories, 116-23 Jamaica Ave., Richmond Hill 18, N. Y.—AT
Ready-Power Co., 11231 Freud Ave., Detroit 14, Mich.—AP, AE
Reeves-Hoffman Corp., 321 Cherry St., Carlisle, Pa.—AC
Reiner Electronics Co., 152 W. 25th St., New York 1, N. Y.—AF, AM, AP
Roanwell Corp., 662 Pacific St., Brooklyn 17, N. Y.—AI
Robinson Aviation, Inc., Teterboro Air Terminal, Teterboro, N. J.—AZ
Schuttig & Co., 9th & Kearny Sts., N. E. Washington 17, D. C.—AA, AF, AM, AP, AT, AH, AN, AG, AL
Scientific Radio Products Co., 738 W. Broadway, Council Bluffs, Iowa—AC
Scientific Radio Service, 4301 Sheridan St., Hyattsville, Md.—AC
Sierra Electronic Corp., P. O. Box 346, San Carlos, Calif.—AT, AG
Simplophone Corp. of America, 303 Fifth Ave., New York 16, N. Y.—AI
Stancil-Hoffman Corp., 1016 N. Highland Ave., Hollywood 38, Calif.—AB
Standard Electronics Corp., 25 W. 43 St., New York 18, N. Y.—AC
Standard Piezo Co., P. O. Box 164, Carlisle, Pa.—AC
Stromberg-Carlson Co., 100 Carlson Rd., Rochester, N. Y.—AI
Suburban Radio Co., 158 Central Ave., Rochelle Park, N. J.—AF, AM, AP, AE, AT
Telectro Industries Corp., 35-16 37th St., Long Island City 1, N. Y.—AF, AM, AP, AE, AR, AH, AN, AG, AI
Telemark, Inc., 100 Greyrock Pl., Stamford, Conn.—AF, AR, AN, AG
Telrex, Inc., Neptune Highway, Asbury Park, N. J.—AA
Thordarson Electric Mfg. Div., Maguire Industries Inc., 500 W. Huron St., Chicago 10, Ill.—AP, AE
Titeflex, Inc., 500 Frelinghuysen Ave., Newark 5, N. J.—AR, AH
Transmitter Equipment Mfg. Co., 345 Hudson St., New York 14, N. Y.—AF, AM, AP, AT, AR, AI
U. S. Motors Corp., 584 Nebraska St., Oshkosh, Wisc.—AE
Valpey Crystal Corp., 1244 Highland St., Holliston, Mass.—AC
Varo Mfg. Co., Box 638, Garland, Tex.—AP, AE
Warren Mfg. Co., 250 East St., New Haven, Conn.—AA
Webster Electric Co., Clark & DeHoven Aves., Racine, Wisc.—AI
Western Sound & Electric Labs., 805 S. Fifth St., Milwaukee, Wisc.—AI
Westline Electronics Co., 11660 Olympic Blvd., Los Angeles 25, Calif.—AC
Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark 5, N. J.—AL
Wheeler Insulated Wire Co., 150 E. Aurora St., Waterbury 20, Conn.—AI
Wilcox Electric Co., 14 & Chestnut St., Kansas City Mo.—AC, AF, AM, AP, AE, AT, AW, AV, AI, AX
Winslow Co., 9 Liberty St., Newark 5, N. J.—AN, AI
Workshop Associates, 66 Needham St., Newton Highland 61, Mass.—AA

5—*Tubes*

Cathode-ray ..... **VC**
Receiving ..... **VB**
Rectifier ..... **VR**
Special type ..... **VS**
Studio, audio ..... **VA**
Studio, video ..... **VV**
Transmitting ..... **VT**

Accurate Engineering Co., 2005 Blue Island Ave., Chicago 8, Ill.—VR
Aerolux Light Corp., 653 11th Ave., New York 19, N. Y.—VS
American British Technology, Inc., 57 Park Ave., New York 16, N. Y.—VC
American Scientific Co., P. O. Box 1, High Bridge Station, New York 52, N. Y.—VS
American Television Inc., 523 S. Plymouth Ct., Chicago 5, Ill.—VC
Amperex Electronic Corp., 79 Washington St., Brooklyn, N. Y.—VT, VR
Amperite Co., 561 Broadway, New York 12, N. Y.—VS
Anton Electronic Labs., 1226 Flushing Ave., Brooklyn 6, N. Y.—VS
Arc Radio Corp., 523 Myrtle Ave., Brooklyn 5, N. Y.—VC
Beam Instrument Corp., 511 5th Ave., New York 17, N. Y.—VC
Bendix Aviation Corp., Eclipse-Pioneer Div., Teterboro, N. J.—VR, VS
Berger Communications, 109-01 72 Rd., Forest Hills, L. I., N. Y.—VC
Bradley Laboratories, 82 Meadow St., New Haven 10, Conn.—VD
Capehart-Farnsworth Corp., 3700 Pontiac St., Ft. Wayne 1, Ind.—VC, VS
Chatham Electronics Corp., 475 Washington St., Newark 2, N. J.—VR, VS, VT
Continental Electric Co., 715 Hamilton St., Geneva, Ill.—VS, VA, VC, VR
Detect-O-Ray Co., 2622 N. Halsted St., Chicago 14, Ill.—VS
DuMont Laboratories Inc., Allen B., 1000 Main Ave., Clifton, N. J.—VC, VV, VT (See ad P. 36)
Eitel-McCullough Inc., 728 San Mateo Ave., San Bruno, Calif.—VC, VR, VS, VT (See ad P. 43)
Electronic Products Co., 111 E. 3rd St., Mt. Vernon, N. Y.—VS
Electronic Tube Corp., 1200 E. Mermaid Lane, Philadelphia 18, Pa.—VC
Electrons, Inc., 127 Sussex Ave., Newark 4, N. J.—VR, VS
Electro Sales Co., Inc., 399 Atlantic Ave., Boston 10, Mass.—VC, VR, VS, VA, VV, VT
Electro-Tech Equipment Co., 117 Lafayette St., New York 13, N. Y.—VR, VS, VT
Eureka Television & Tube Corp., 69 5th Ave., Hawthorne, N. J.—VC
Federal Telecommunication Laboratories, 500 Washington Ave., Nutley 10, N. J.—VS, VT
Federal Telephone & Radio Corp., 100 Kingsland Rd., Clifton, N. J.—VR, VS, VT
Freeland Products Co., 700 Dryades St., New Orleans 13, La.—VT
Gates Radio Co., Quincy, Ill.—VC, VR, VS, VA, VT
General Electric Co., Electronics Dept., Tube Div., Schenectady 5, N. Y.—VC, VR, VS, VA, VV, VT, VB
General Electronics, Inc., 101 Hazel St., Paterson, N. J.—VC, VR, VS, VT
Heintz & Kaufman Div., Robert Dollar Co., 947 Broadway, Redwood City, Calif.—VR, VS, VT
Huggins Laboratories, 740 Hamilton Ave., Menlo Park, Calif.—VS
Hytron Radio & Electronics Corp., 76 Lafayette St., St., Salem, Mass.—VC, VR, VA, VV, VT, VB
International Rectifier Corp., 6809 S. Victoria Ave., Los Angeles 43, Calif.—VS
Kip Electronics Corp., 155 Waverly Pl., New York 14, N. Y.—VR, VS
Kuthe Laboratories, Inc., 150 Summit St., Newark 4, N. J.—VS
Lansdale Tube Co., Lansdale, Pa.—VC, VB
Lectrovision, Inc., 144 Union Ave., New Rochelle, N. Y.—VC
Lewis & Kaufman, Inc., P. O. Box 337, Los Gatos, Calif.—VR, VS, VV, VT
Liberty Electronics Inc., 135 Liberty St., New York 6, N. Y.—VC, VR, VS, VA, VV, VT
Machlett Laboratories Inc., Springdale, Conn.—VR, VS, VT
National Electronics, Inc., Geneva, Ill.—VR, VS
National Union Radio Corp., 350 Scotland Rd., Orange, N. J.—VB, VS, VT, VC
National Video Corp., 3019 W. 47 St., Chicago, Ill.—VC
North American Philips, 100 E. 42 St., New York 17, N. Y.—VC, VS
Northeastern Research Inc., P. O. Box 607, Springdale, Conn.—VT
Pacific Electronics, Shannon Rd., Los Gatos, Calif.—VT
Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.—VC VR, VS, VA, VV, VB
Radiant Lamp Corp., 300 Jelliff Ave., Newark 8, N. J.—VR
Radio Corp. of America, RCA Victor Div., Camden, N. J.—VC, VR, VS, VA, VV, VB, VT (See ad 4th cover)
Radio Corporation of America, Harrison, N. J.—VA, VB, VC, VR, VS, VT, VV
Rauland Corp., 4241 N. Knox Ave., Chicago 11, Ill.—VC
Raytheon Mfg. Co., 138 River St., Waltham 54, Mass.—VS, VT, VR, VB, VC, VA, VV
Reeder & Co., Charles M., 171 Victor Ave., Detroit 3, Mich.—VS
Reilly Co., Edward R., 218 Fulton St., New York 7, N. Y—VR, VS, VT
Remington Rand Inc., Picture Tube Prod. Div., Wilson Ave., S. Norwalk, Conn.—VC
Sarkes-Tarzian, Inc., Tube Division, 214 Central Ave., Hawthorne, N. J.—VC, VV
Sheldon Electric Co., 68 Coit St., Irvington 11, N. J.—VC
Sonotone Corp., Elmsford, N. Y.—VS
Spellman Television Corp., 3029 Webster Ave., New York 67, N. Y.—VC, VR, VS

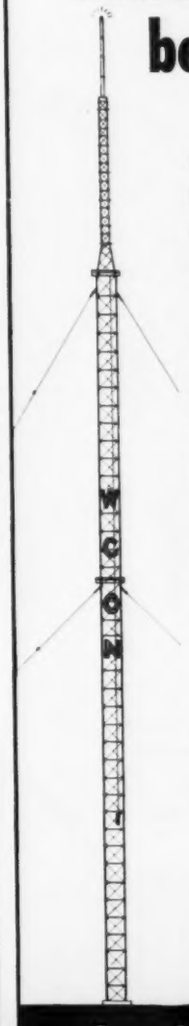
Sperry Gyroscope Co., Div., Sperry Corp., Great Neck, L. I., N. Y.—VT
Standard Arcturus Corp., 54 Clark St., Newark 4, N. J. —VS, VB
States Co., 19 New Park Ave., Hartford 6, Conn.—VD
Sylvania Electric Products Co., 1740 Broadway, New York 19, N. Y.—VC, VR, VS, VT, VB (See ad P. 34)
Taylor Tubes, Inc., 2318 Wabansia Ave., Chicago 47, Ill. —VT, VC, VR, VS
Tel-O-Tube Corp. of America, 180 Van Riper Ave., E. Paterson, N. J.—VC
Thomas Electronics Inc., 118 9th St., Passaic, N. J.— VC (See ad P. 4)
Tung-Sol Lamp Works, 95 Eighth Ave., Newark 4, N. J. —VC, VR, VT, VB, VS, VA
United Electronics Co., 42 Spring St., Newark 2, N. J. VR, VS, VT
Vacuum Tube Products, 302 N. Clementine St., Oceanside, Calif.—VC, VR, VS, VT
Waterman Products Co., 2445 Emerald St., Philadelphia 25, Pa.—VC
Wells Sales, Inc., 320 N. LaSalle St., Chicago 10, Ill. —VB
Westinghouse Electric Corp., Construction & Communications Sec. 10-L. E. Pittsburgh, Pa.—VR, VT
Zetka Television Tubes Inc., 131 Getty Ave., Clifton, N. J.—VC

6—Antennas & Ant. Accessories

Dummy antenna ..... **CB**
Antenna lighting equipment ..... **CL**
Custom equipment ..... **CZ**
Ground systems ..... **CG**
Insulators ..... **CI**
Isolation unit ..... **CU**
Phase measuring equipment ..... **CY**
Phasing & tuning units ..... **CP**
Radiators, FM ..... **CF**
Radiators, TV ..... **CV**
RF Power monitors ..... **CM**
Standing wave ratio meters ..... **CW**
Switching equipment ..... **CC**
Towers, AM ..... **CA**
Towers, supporting ..... **CS**

Air Associates, Inc., Teterboro, N. J.—CP
Allied Radio Corp., 833 W. Jackson Blvd., Chicago 7, Ill.—CS
Alpar Mfg. Co., 466 St. Francis St., Redwood City, Calif.—CS
Alpha Wire Corp., 50 Howard St., New York 13, N. Y. —CT
Aluminum Products Co., Box 56F, Mineral Wells, Texas CS
American Bridge Co., 436 7th Ave., Pittsburgh 30, Pa. —CA, CS, CZ
American Gas Accumulator Co., 1029 Newark Ave., Elizabeth 3, N. J.—CL
Andrew Corp., 363 E. 75 St., Chicago 19, Ill.—CL, CF, CV, CP, CT, CY, CZ, CC
Baker Mfg. Co., 133 Enterprise St., Evansville, Wisc.— CS, CZ
Barker & Williamson, Inc., 237 Fairfield Ave., Upper Darby, Pa.—CP
B. D. N. Steel Erecting Co., 82 W. Washington Blvd., Chicago 2, Ill.—CA, CS, CZ
Blaw-Knox Co., Blawnox, Pa.—CA, CS, CZ, CI
Camburn, Inc., 32-40 57th St., Woodside, L. I., N. Y. —CL
Clarke Instrument Corp., 910 King St., Silver Spring, Md.—CY
Clear Beam Antennas, 618 N. LaBrea, Los Angeles 36, Calif.—CL, CZ
Clowes Ceramic Corp., 3711 Calhoun Ave., Chattanooga 7, Tenn.—CI
Coil Winders, Inc., 61 Bergen St., Brooklyn 2, N. Y.— CP
Collins Radio Co., 855 35th St., N. E., Cedar Rapids, Iowa—CL, CF, CP, CT
Communications Co., 300 Greco Ave., Coral Gables, Fla. —CF
Continental Electronics, 1728 Wood St., Dallas 1, Texas —CP
Custom Craft Mfg. Co., 256 E. 98th St., Brooklyn 12, N. Y.—CZ
Dalmo Victor Co., 1414 El Camino Real, San Carlos, Calif.—CT
Designers for Industry, Inc., 2915 Detroit Ave., Cleveland 13, Ohio—CC, CZ
DuMont Laboratories Inc., Allen B., 1000 Main Ave., Clifton, N. J.—CV, CT
Easy-Up Tower Co., 3800 Kinzie Ave., Racine, Wisc.— CS
Elizabeth Iron Works, Inc., P. O. Box 360, Elizabeth B, N. J.—CF, CV, CA, CS, CZ
Emsco Derrick & Equipment Co., P. O. Box 2098, Terminal Annex, Los Angeles 54, Calif.—CF, CV, CT, CA, CS, CZ
Erco Radio Laboratories, Stewart Ave., E., Garden City, L. I., N. Y.—CF
Federal Telecommunication Laboratories, 500 Washington Ave., Nutley 10, N. J.—CV
Federal Telephone & Radio Corp., 100 Kingsland Rd., Clifton, N. J.—CL, CF, CV, CP, CT, CG, CA, CS
Fisher-Pierce Co., 70 Ceylon St., Boston 21, Mass.—CL
Gates Radio Co., Quincy, Ill.—CL, CF, CP, CT, CG, CA, CS
General Cable Corp., 420 Lexington Ave., New York 17, N. Y.—CT
General Electric Co., Electronics Dept., Syracuse, N. Y. —CL, CF, CV, CP, CT, CG, CA, CS, CB
Haydon Products Corp., 1801 8th Ave., Brooklyn 15, N. Y.—CI
Hewlett Packard Co., 395 Page Mill Road, Palo Alto, Calif.—CW
Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—CF
Hughey & Phillips, 326 N. La Cienega Blvd., Los Angeles 48, Calif.—CL, CZ
International Derrick & Equip. Co., 875 Michigan Ave., Columbus 8, Ohio—CL, CF, CV, CA, CS, CZ
Isolantite Mfg. Corp., Warren Ave., Stirling, N. J.—CI
I-T-E Circuit Breaker Co., 19th & Hamilton Sts., Philadelphia 30, Pa.—CL
Johnson Co., E. F., Waseca, Minn.—CP, CT, CI, CZ
Jones Electronics Co., M. C., 96 N. Main St., Bristol, Conn.—CM, CW
Kings Electronics Co., 811 Lexington Ave., Brooklyn 21, N. Y.—CP, CT
Lehigh Structural Steel Co., Allentown, Pa.—CG, CA, CS, CZ
Lingo & Son, John E., 2814 Buren Ave., Camden 5, N. J.—CF, CV, CA, CS, CZ
Link Radio Corp., 125 W. 17 St., New York 11, N. Y. —CL, CF, CT, CS
Locke, Inc., Charles & Cromwell Sts., Baltimore 3, Md. —CI
Mesker Steel Corp., George L., Evansville 8, Ind.—CS
Mueller Electric Co., 1583 E. 31st St., Cleveland 14, Ohio—CI
Network Mfg. Corp., 213 W. 5th St., Bayonne, N. J.— CL, CP, CT
New England Electrical Works, 365 Main St., Lisbon, N. H.—CG
Product Development Co., 526 Elm St., Arlington, N. J. ——CL, CP, CT, CG, CS, CC
Radio Corp. of America, RCA-Victor Div., Camden, N. J. —CL, CF, CV, CP, CT, CG, CA, CS
Radio Engineering Laboratories, 36-40 37 St., Long Island City 1, N. Y.—CF
Raytheon Mfg. Co., 138 River St., Waltham, Mass.— CL, CF, CP, CT, CG, CA, CS
Reeves-Hoffman Corp., 321 Cherry St., Carlisle, Pa.— CP
Rostan Corp., 202 E. 44th St., New York 17, N. Y.— CS, CZ
Schumaker Construction Co., Michigan City, Ind.—CZ

Tower erection work halted because of low ceiling—



read the telegram of Ideco's erection superintendent to the home office when low clouds made it impossible for men perched high on the tower to see the ground crew during the construction of the world's tallest radio and television tower — WCON, Atlanta, Georgia.

Came better weather and erection work continued uninterrupted, the 1057 foot tower being completed on schedule. Although Mother Nature's low hem of clouds caused a momentary pause in work, Ideco engineers will have the last laugh.

Ideco's triangular section design provides extra rigidity and freedom from distortion — WCON will safely withstand all the elements in the book, including winds of hurricane proportions.

Designed, fabricated, and erected by Ideco, WCON is an outstanding example of complete Ideco engineering. Ideco engineering covers the entire job — transmission lines, service ladders and elevators, platforms, and any special accessories required.

From coast to coast, for every type of radio and television tower, Ideco is prepared to handle every detail of your requirements. Why not write today for complete information.

See IDECO for a complete job!

Engineered from foundation to finish.

INTERNATIONAL DERRICK & EQUIPMENT CO.
Columbus, Ohio Torrance, California

For more information on WCON and other IDECO towers fill in this coupon and mail.
NAME _____
TITLE _____
ADDRESS _____

Mail to
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875 Michigan Avenue, Columbus 8, Ohio

Skyline Tower Co., 5900 S. Ashland Ave., Chicago 36, Ill.—CS
Square Root Mfg. Corp., 901 Nepperhan Ave., Yonkers 3, N. Y.—CZ
Stainless Inc., 3rd St., N. Wales, Pa.—CZ, CS
States Co., 19 New Park Ave., Hartford 6, Conn.—CI
Steward Mfg. Co., D. M., P. O. Box 510, Chattanooga 1, Tenn.—CI
Telectro Industries Corp., 35-16 37th St., Long Island City 1, N. Y.—CP, CT
Time-O-Matic Co., P. O. Box 850, Danville, Ill.—CL
Tower Construction Co., 402 Commerce Bldg., Sioux City 9, Ia.—CS, CA, CZ
Trio Mfg. Co., Griggsville, Ill.—CL, CF, CV, CP, CS
Truscon Stel Co., Albert St., Youngstown 1, Ohio—CA, CS, CZ, CI
Upright Scaffolds Div. Up-Right Inc., 1013 Pardee St., Berkeley 10, Calif.—CS
Vesto Co., Parkville, Mo.—CS
Warren Mfg. Co., 250 East St., E. Haven, Conn.—CL
Westinghouse Electric Corp., Construction & Communications Sec. 10-L, E. Pittsburgh, Pa.—CL, CP
Wheeler Laboratories, 259-09 Northern Blvd., Great Neck, L. I., N. Y.—CZ
Wincharger Corp., 7th St. & Division, Sioux City, Iowa —CA, CS
Wind Turbine Co., E. Market St. & Penna. RR, West Chester, Penna.—CL, CT, CG, CA, CS, CZ (See ad P. 46)
Winslow Co., 9 Liberty St., Newark 5, N. J.—CP
Workship Associates, 66 Needham St., Newton Highlands 61, Mass.—CF, CT

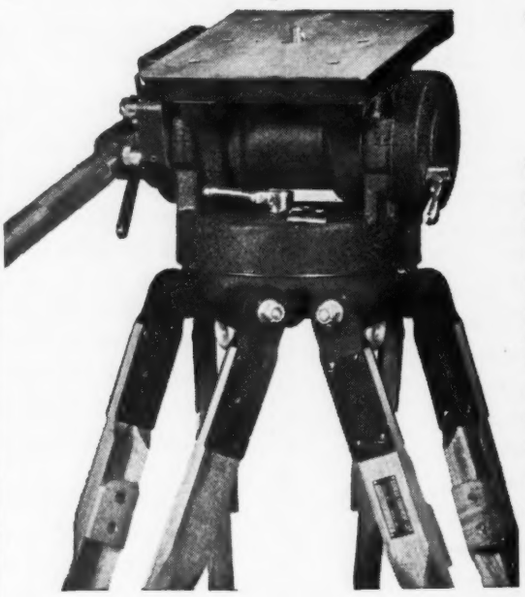
STUDIO EQUIPMENT

7—Video

Accessories ..... EA
Amplifiers, distribution ..... ED
Amplifiers, stabilizing ..... ES
Attenuators ..... EF
Cameras ..... EC
Camera controls ..... ET
Camera cranes ..... ER
Camera Dollies ..... EL
Camera switching systems ..... EW
Consoles, control ..... EO
Consoles, remote switching ..... EN
Master control ..... EM
Distribution & mixing equipment ..... EX
Distribution system, TV, RF ..... EQ
Flying spot scanner ..... EW
Lenses ..... EE
Line & Program monitors ..... EP
Power supplies ..... EI
Receivers ..... EB
Sync. generators ..... EG
Sync. stretchers ..... EH
Tripods ..... EK
Patch cords ..... EZ
Video Patch panels ..... EV
Projection units ..... EY

Accurate Engineering Co., 2005 Blue Island Ave., Chicago 8, Ill.—EI
Akeley Camera & Instrument Corp., 175 Varick St., New York 14, N. Y.—EC, ET, ER, EL EW, EN, EE, EK
American Electroneering Co., 2112 S. LaBrea, Los Angeles 16, Calif.—ED, ES, EX, EI
American Television & Radio Co., 300 E. 4th St., St. Paul 1, Minn.—EI
Amplifier Corp. of America, 398 Broadway, New York 13, N. Y.—ED, ES, EI
Atlas Sound Corp., 1449 39th St., Brooklyn 18, N. Y.—EK
Bache & Co., Semon, Greenwich & Morton Sts., New York 14, N. Y.—EE
Back Video Corp., F. G., 500 Fifth Ave, New York 18, N. Y.—EE
Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N. Y.—EE
Bell & Howell Co., 7100 McCormick Rd., Chicago 45, Ill.—EE, EK
Bendix Aviation Corp., Eclipse-Pioneer Div., Teterboro, N. J.—EA
Beta Electric Corp., 1762 3rd Ave., New York 29, N. Y.—EI
Brand Camera Co., 2411 W. Magnolia Blvd., Burbank, Calif.—EC
Burke & James, 321 S. Wabash Ave., Chicago, Ill.—EE
Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—EO, EN, EX, EP
Coil Winders, Inc., 61 Bergen St., Brooklyn 2, N. Y.—EA
Compco Corp., 2251 W. St. Paul Ave., Chicago 47, Ill. EA
Da-Lite Screen Co., 2711 N. Pulaski Rd., Chicago 39, Ill.—EA, EK
Daven Co., 191 Central Ave., Newark 4, N. J.—EA, EF
Display Lighting, Inc., 417 E. 61st St., New York 21, N. Y.—EK
DuMont Labs. Inc., Allen B., 1000 Main Ave., Clifton, N. J.—EA, ED, ES, EC, ET, ER, EL, EW, EO, EN, EM, EX, EE, EP, EI, EG, EH, EK, EU
Duotone Co., Locust St., Keyport, N. J.—EE
Eastman Kodak Co., 343 State St., Rochester 4, N. Y. —EE
Electronic Measurements Co., Box 850, Red Bank, N. J. —ED, EI
Electronic Transformer Co., 207 W. 25th St., New York 1, N. Y.—EI
Electro Sales Co., Inc., 399 Atlantic Ave., Boston 10, Mass.—EI, EG
Federal Telecommunication Laboratories, 500 Washington Ave., Nutley 10, N. J.—ED, ES, EO, EP, EI, EG, EH
Federal Telephone & Radio Corp., 100 Kingsland Rd., Clifton, N. J.—EA, ED, ES, EO, EN, EM, EX, EP, EI, EG, EH
Furst Electronics, 12 S. Jefferson St., Chicago 6, Ill.—EI
Gale Dorothea Mechanisms, 37-61 85 St., Jackson Heights, L. I., N. Y.—ED, ES
General Electric Co., Electronics Dept., Syracuse, N. Y. —EA, ED, ES, EC, ET, ER, EL, EW, EO, EN, EM, EX, EE, EP, EI, EG, EH, EK
General Precision Laboratory, 63 Bedford Rd., Pleasantville, N. Y.—EC, ET, ER, EL, EW, EO, EN, EM, EX, EE, EI, EG, EH, EK
Goslin Electric & Mfg. Co., 2921 W. Olive Ave., Burbank, Calif.—EI
Gray Research & Development Co., 16 Arbor St., Hartford 1, Conn.—EA, EX
Gundlach Mfg. Corp., Fairport, N. Y.—EE
Hamilton Electronics, 2726 Pratt Ave., Chicago 45, Ill. EI
Highland Engineering Co., 32 Holman Blvd., Hicksville, L. I., N. Y.—ED, ES, EI
Houston-Fearless Corp., W. Los Angeles 64, Calif.—EK, EL, ER
Hunton Plastics Co., 178 S. Van Brunt St., Englewood, N. J.—EE
Imperial Chemical Industries, 521 Fifth Ave., New York 17, N. Y.—EY
Industrial Electronics, 2457 Woodward Ave., Detroit 1, Mich.—EI
Industrial Television, Inc., 359 Lexington Ave., Clifton, N. J.—EP

Floating Action! for all TV Cameras



"BALANCED" TV TRIPOD
Pat. Pending

This tripod was engineered and designed expressly to meet all video camera requirements.

Previous concepts of gyro and friction type design have been discarded to achieve absolute balance, effortless operation, super-smooth tilt and pan action, dependability, ruggedness & efficiency.

Below: 3-wheel portable dolly with balanced TV Tripod mounted.

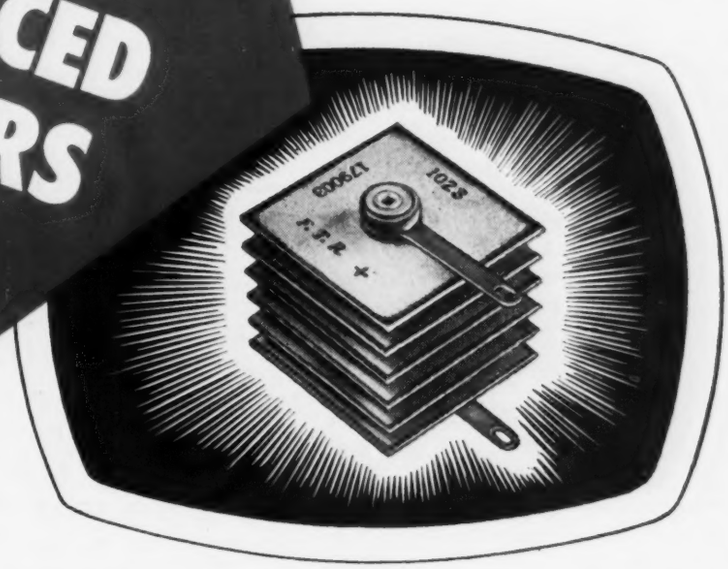
Complete 360° pan without ragged or jerky movement is accomplished with effortless control. It is impossible to get anything but perfectly smooth pan and tilt action with the "BALANCED" TV Tripod.

Quick-release pan handle adjustment locks into position desired by operator with no "play" between pan handle and tripod head. Tripod head mechanism is rustproof, completely enclosed, never requires adjustments, cleaning or lubrication. Built-in spirit level. Telescoping extension pan handle.

Write for further particulars

CAMERA EQUIPMENT CO.
1600 BROADWAY NEW YORK CITY

The "POWER" behind the Big Trend to LOWER-PRICED TV RECEIVERS



Federal's

Miniature SELENIUM RECTIFIER

The new trend in television is to receivers of higher-than-ever quality . . . at lower-than-ever prices!

The "power" behind this fast-growing swing is Federal's Miniature Selenium Rectifier . . . a vital factor in bringing *better* television to *more* people.

Sales-wise manufacturers are utilizing this revolutionary component to drastically reduce the size, weight and cost of TV receivers . . . by eliminating heavy, bulky, expensive power transformers . . . expendable rectifier tubes . . . filter chokes.

Specifically designed for television service, Federal Miniature Selenium Rectifiers are readily available in ratings to cover the full range of TV power requirements of sets using from 7" to 20" picture tubes.

Write today for full information. Address Dept. F-966.

Made by America's Oldest and Largest Producer of Selenium Rectifiers.

Federal Telephone and Radio Corporation

SELENIUM and INTELIN DIVISION, 100 KINGSLAND ROAD, CLIFTON, NEW JERSEY
In Canada: Federal Electric Manufacturing Company, Ltd., Montreal, P. Q.
Export Distributors: International Standard Electric Corp., 67 Broad St., N. Y.

J. & A. Television & Mfg. Co., 5066 Broadway, Chicago 40, Ill.—EG
Jamaica Television Mfg. Co., 95-26 Sutphin Blvd., Jamaica 4, L. I., N. Y.—EC, EW, EO, EN, EM, EP, EG, EH
Kepco Laboratories, 149-14 41st Ave., Flushing, N. Y. —EI
Keystone Electronics Co., 50 Franklin St., New York 13, N. Y.—EA
Kollmorgen Optical Corp., 2 Franklin Ave., Brooklyn 11, N. Y.—EE
Lambda Electronics Corp., 103-02 Northern Blvd., Corona, L. I., N. Y.—EI
Lavoie Laboratories, Morganville, N. J.—ED
Libra Film Distributors, 6525 Sunset Blvd., Hollywood 28, Calif.—EL, EK, EC
Micro Engineering Corp., 15 E. Tujunga Ave., Burbank, Calif.—EC, ER, EL, EW, EK
Minnesota Electronics Corp., 97 E. 5th St., St. Paul 1, Minn.—ED
National Cine Equipment, Inc., 20 W. 22nd St., New York 10, N. Y.—ER, EL, EE, EK
National Electrical Machine Shops, 919 Jesup-Blair Dr., Silver Spring, Md.—EA, EX, EV, EZ
North American Electric Lamp Co., 1014 Tyler St., St. Louis 6, Mo.—EY
North American Philips Co., 100 E. 42nd St., New York, N. Y.—EY
Pancro Mirrors, Inc., 2958 Los Feliz Blvd., Los Angeles 39, Calif.—EE
Pentron Corp., 611 W. Division St., Chicago 10, Ill.— ED, ES
Perkin-Elmer Corp., P. O. Box 331, Glenbrook, Conn.— EE
Petrick Bros., 1938 N. Springfield Ave., Chicago 47, Ill.—EK
Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.— EX, EP, EI
Polarad Electronics Corp., 100 Metropolitan Ave., Brooklyn 11, N. Y.—EA, ED, ES, EC, ET, EW, EO, EM, EX, EP, EI, EG
Precision Products, Inc., 719 17 St., N. W., Washington, D. C.—EC, EE
Premier Electronic Lab., 382 Lafayette St., New York 3, N. Y.—EG
Projection Optics Co., 330 Lyell Ave., Rochester 6, N. Y. —EE
Radiant Specialty Co., 1225 S. Tallman Ave., Chicago, Ill.—EK
Radio Corp. of America, RCA-Victor Div., Camden, N. J. —EA, ED, ES, EC, ET, ER, EL, EW, EO, EN, EM, EX, EE, EP, EI, EG, EH, EK, EY
Radio Supply & Engineering Co., 85 Selden Ave., Detroit 1, Mich.—EA, ED, ES, EC, EW
Ram Electronics Inc., S. Buckhout St., Irvington, N. Y. —EI
Raytheon Mfg. Co., Waltham, Mass.—EA
Reeves Soundcraft Corp., 35-54 36 St., Long Island City 6, N. Y.—EY
Republic Lens Co., 916 Ninth Ave., New York 19, N. Y. —EE
Saftee Glass Co., 4717 Stenton Ave., Philadelphia 44, Pa.—EE
Skiatron Corp., 381 Fourth Ave., New York, N. Y.—EY
Spellman Television Corp., 3029 Webster Ave., New York 67, N. Y.—EE, EI
Spencer-Kennedy Laboratories, 186 Mass. Ave., Cambridge 39, Mass.—ED
Stoddart Aircraft Radio Co., 6644 Santa Monica Blvd., Hollywood 38, Calif.—EF
Tech Laboratories, Inc., Bergen & Edsall Blvds., Palisades Park, N. J.—EM, EX
Television Equipment Corp., 238 William St., New York 7, N. Y.—EA, ED, EC, ET, EW, EP, EI, EG, EQ, EY
Tel-Instrument Co., 50 Paterson Ave., E. Rutherford, N. J.—ED, EG
Thordarson Electric Mfg. Div., Maguire Industries, Inc., 500 W. Huron St., Chicago 10, Ill.—EI
Trans-Lux Corp., 1270 6th Ave., New York, N. Y.— EA, EE
Viewlex, Inc., 35-01 Queens Blvd., Long Island City 4, N. Y.—EE
Warren Mfg. Co., 250 East St., E. Haven, Conn.—EA
Weinschal Engineering Co., 123 William St., New York 7, N. Y.—EF
Western Sound & Electric Labs., 805 S. 5th St., Milwaukee, Wisc.—ED, EO, EX
Weston Laboratories, 410 Glen Rd., Weston 93, Mass. —EI
Winslow Co., 9 Liberty St., Newark 5, N. J.—EA
Zenith Optical Laboratory, 123 W. 64 St., New York 23, N. Y.—EE

8—Studio Transmitter Links & Microwave Relay Equipment

Antennas ..... LA
Antenna microwave ..... LB
Auxiliary equipment ..... LE
Micro-wave accessories LL
Micro-wave equipment ..... LM
Micro-wave test equipment LX
Micro-wave complete relay unit ..... LN
Receivers, studio link ..... LR
Transmitters ..... LT

American Electroneering Co., 2112 S. La Brea, Los Angeles 16, Calif.—LR, LT
Andrew Corp., 363 E. 75 St., Chicago 18, Ill.—LA, LB, LL
Automatic Electric Sales, 1033 W. Van Buren St., Chicago 7, Ill.—LE, LM
Canoga Corp., 14315 Bessemer, Van Nuys, Calif.—LM
Clear Beam Antennas, 618 N. LaBrea, Los Angeles 36, Calif.—LA
Communication Devices Co., 2331 12th Ave., New York 27, N. Y.—LR, LT
Dalmo Victor Co., 1414 El Camino Real, San Carlos, Calif.—LA, LM
DuMont Laboratories Inc., Allen B., 1000 Main Ave., Clifton, N. J.—LA, LE, LM, LR, LT, LB, LN
Electro Impulse Laboratory, Box 250, Red Bank, N. J. —LX, LN
Electronic Measurements Co., Box 850, Red Bank, N. J —LM, LR, LT
Electronic Research & Mfg. Corp., 1420 E. 25 St., Cleveland 14, Ohio—LR, LT
Engineering Associates, 434 Patterson Rd., Dayton 9, Ohio—LR
Federal Telecommunication Laboratories, 500 Washington Ave., Nutley 10, N. J.—LA, LE, LM, LR, LT, LB, LN, LL
Federal Telephone & Radio Corp., 100 Kingsland Rd., Clifton, N. J.—LB, LA, LE, LM, LR, LT, LL, LX
Gadgets, Inc., 3639 N. Dixie Drive, Dayton 5, Ohio —LL
Gates Radio Co., Quincy, Ill.—LT
General Electric Co., Electronics Dept., Syracuse, N. Y. —LA, LE, LM, LR, LT, LL, LN, LX
Grady Instrument Co., 689 Belmont St., Belmont 78, Mass.—LA, LE, LM, LR, LT
Hewlett Packard Co., 395 Page Mill Road, Palo Alto, Calif.—LL, LX
Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—LE, LM, LR, LT
I-T-E Circuit Breaker Co., 19th & Hamilton Sts., Philadelphia 30, Pa.—LB, LL
Jamaica Television Mfg. Co., 95-26 Sutphin Blvd., Jamaica 4, L. I., N. Y.—LA, LR, LT
Jones Electronics Co., M. C., 96 N. Main St., Bristol, Conn.—LE
Kalbfell Laboratories, 1076 Morena Blvd., San Diego 10, Calif.—LR
Kings Electronics Co., 811 Lexington Ave., Brooklyn 21, N. Y.—LM
Lavoie Laboratories, Morganville, N. J.—LB, LL, LX, LM
Leru Laboratories, 360 Bleecker St., New York 14, N. Y. —LM, LX, LL
Link Radio Corp., 125 W. 17 St., New York 11, N. Y. —LA, LE, LM, LR, LT
Lumenite Electronic Co., 407 S. Dearborn St., Chicago 5, Ill.—LR, LT
Micro Engineering Corp., 15 E. Tujunga Ave., Burbank, Calif.—LM
Microwave Equipment Co., Greenbrook Rd., Caldwell, N. J.—LA, LE, LM, LB, LN, LL, LX
Modulation Products Co., 92 East End Ave., New York, N. Y.—LR, LT
Motorola, Inc., 4545 Augusta Blvd., Chicago 51, Ill.— LM
Network Mfg. Corp., 213 W. 5th St., Bayonne, N. J.— LA, LM
Peek Inc., Walter E., 2842 W. 30 St., Indianapolis 22, Ind.—LA
Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.— LA, LE, LM, LR, LT, LB, LN, LL, LX
Polytechnic Research & Development Co., 202 Tillary St., Brooklyn 1, N. Y.—LM, LL, LX
Premier Instrument Corp., 52 W. Houston St., New York 12, N. Y.—LL
Product Development Co., 526 Elm St., Arlington, N. J. —LA
Radio Corp. of America, RCA Victor Div., Camden, N. J.—LA, LE, LM, LR, LT, LB, LN, LL, LX
Radio Engineering Laboratories, 35-34 36th St., Long Island City, N. Y.—LR, LT, LA, LM, LL
Raytheon Mfg. Co., 138 River St., Waltham, Mass.— LA, LM, LR, LT, LB, LL, LX, LN, LE
Sierra Electronic Corp., P. O. Box 346, San Carlos, Calif.—LT
Spencer-Kennedy Laboratories, 186 Mass. Ave., Cambridge 39, Mass.—LE
Sperry Gyroscope Co., Div., Sperry Corp, Great Neck, L. I., N. Y.—LM, LL, LX, LB
Sylvania Electric Products Co., 1740 Broadway, New York 19, N. Y.—LE, LL
Telectro Industries Corp., 35-16 37th St., Long Island City 1, N. Y.—LM
Telrex, Inc., Neptune Highway, Asbury Park, N. J.—LA
Terpening Co., L. H., 16 W. 61 St., New York 23, N. Y. —LL, LL
Titeflex, Inc., 500 Frelinghuysen Ave., Newark 5, N. J. —LM
Varian Associates, 83 Washington St., San Carlos, Calif. —LL, LX
Warren Mfg. Co., 250 East St., New Haven, Conn.—LA
Weymouth Instrument Co., 1440 Commercial St., E. Weymouth 89, Mass.—LM, LB, LL
Workshop Associates, 66 Needham St., Newton Highlands 61, Mass.—LA, LE, LM, LB

9—Audio

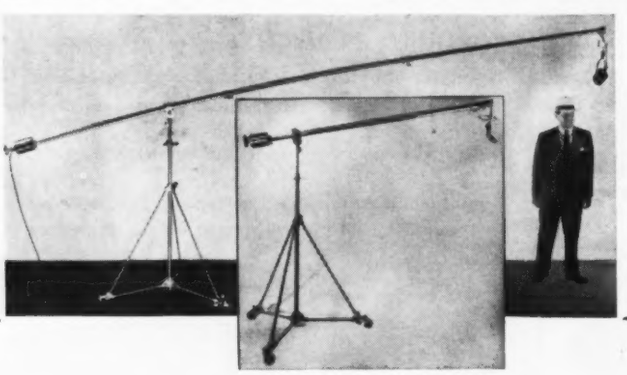
Accessories ..... SA
Attenuators ..... SZ
Sounds effects consoles ..... SE
Studio control consoles ..... SC
Microphones ..... SM
Microphone stands & booms ..... SS
Microphone nameplates ..... SB
Intercom systems ..... SF
Radio cueing systems ..... SD
Sound reinforcement systems ..... SR

Airtronix Development Corp., 20 W. 22nd St., New York 10, N. Y.—SR
Altec Lansing Corp., 1161 N. Vine St., Hollywood 38, Calif.—SM, SR
American Communications Corp., 306 Broadway, New York 7, N. Y.—SA, SC, SR
American Microphone Co., 370 S. Fair Oaks Ave., Pasadena 1, Calif.—SM, SS
Amperite Co., Inc., 561 Broadway, New York 12, N. Y. —SM
Arlington Electric Products, Inc., 500 W. 52nd St., New York 19, N. Y.—SC, SR
Art Specialty Co., 3245 W. Lake St., Chicago 24, Ill. —SS
Astatic Corp., Harbor & Jackson Sts., Conneaut, Ohio —SM (See ad P. 60)
Atlas Sound Corp., 1449 39th St., Brooklyn 18, N. Y. —SA, SS (See ad P. 66)
Audio Development Co., 2833 13th Ave. S., Minneapolis 7, Minn.—SR
Audio Equipment Co., 80-20 45th Ave., Elmhurst L. I., N. Y.—SR
Ballantyne Co., 1707 Davenport St., Omaha 2, Nebr.— SR
Bell & Howell Co., 7100 McCormick Rd., Chicago 45, Ill.—SM
Bell Sound Systems, 555 Marion Rd., Columbus 7, Ohio —SM, SS, SR
Bestcraft Products Co., 626 Broadway, New York 12, N. Y.—SA
Boom Electric & Amplifier Co., 1227 W. Washington Blvd., Chicago 7, Ill.—SR
Browning Laboratories Inc., 743 Main St., Winchester, Mass.—SR
Brumberger Co., 34 34th St., Brooklyn 32, N. Y.—SA
Brush Development Co., 3405 Perkins Ave., Cleveland 14, Ohio—SM
Century Projector Corp., 729 Seventh Ave., New York, N. Y.—SR
Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—SA, SC
Clarkstan Corp., 11921 W. Pico Blvd., Los Angeles 64, Calif.—SA
Collins Radio Co., 855 35th St., N. E., Cedar Rapids, Iowa—SA, SE, SC, SM, SS
Colonial Brass Co., Middleboro, Mass.—SB
Color Tran Converter Co., 7045 Romaine, Hollywood 38, Calif.—SS
Compco Corp., 2251 W. St. Paul Ave., Chicago 47, Ill. —SA
Conn. Telephone & Electric Corp., 70 Britannia St., Meriden, Conn.—SM
Cooper Electronic Products Co., 5106 Frankford Ave., Philadelphia 24, Pa.—SF
Daven Co., 191 Central Ave., Newark 4, N. J.—SA, SZ
Dazor Mfg. Co., 4463 Duncan Ave., St. Louis 10, Mo. —SS
DeVry Corp., 1111 Armitage Ave., Chicago, Ill.—SR
Dilks Co., Box 139, Seymour, Conn.—SR
Display Lighting, Inc., 417 E. 61st St., New York 21, N. Y.—SS (See ad P. 52)
DuMont Labs., Inc., Allen B., 1000 Main Ave., Clifton, N. J.—SA, SC, SM, SS
Electronic Research & Mfg. Corp., 1420 E. 25th St., Cleveland 14, Ohio—SC, SR
Electro-Voice, Inc., Buchanan, Mich.—SM, SA, SS
Executone Inc., 415 Lexington Ave., New York 17, N. Y. —SF, SR
Fairchild Recording Equipment Corp., 154 St. & 7th Ave., Whitestone, N. Y.—SA, SE, SC, SR
Federal Telephone & Radio Corp., 100 Kingsland Rd., Clifton, N. J.—SA, SC
Gale Dorothea Mechanisms, 37-61 85 St., Jackson Heights, L. I., N. Y.—SE
Gates Radio Co., Quincy, Ill.—SA, SE, SC, SM, SS, SR
General Electric Co., Electronics Dept., Syracuse, N. Y. —SA, SC, SM, SS, SE
General Precision Laboratory, 63 Bedford Rd., Pleasantville, N. Y.—SC
Geraton Products, 2115 N. Charles St., Baltimore 18, Md.—SC, SR
Godfrey Mfg. Co., 171 S. 2nd St., Milwaukee 4, Wisc. —SF
Gray Research & Development Co., 16 Arbor St., Hartford 1, Conn.—SA, SE
Hamilton Electronics, 2726 Pratt Ave., Chicago 45, Ill. —SA, SC, SS, SR
Highland Engineering Co., 32 Holman Blvd., Hicksville, L. I., N. Y.—SA

ANOTHER DUMONT FIRST!
The New
Du Mont-Holmes
SUPERSPEED
Projector
Sets new standards of performance, utility and economy for TV station operation. Provides a means of film pickup that approaches the contrast and clarity characteristic of studio productions.
DIRECT FILM PROJECTOR
Used with a Du Mont Special Image-Orthicon film pickup to give *studio clarity* to movies and teletranscriptions.
BACKGROUND PROJECTOR
Brings dramatic moving sets and backgrounds into any studio. Eliminates costly and cumbersome sets and backdrops.
IMAGE ORTHICON PICKUP HEAD
For information on the Superspeed Projector or other Du Mont Telecasting Equipment write, phone, or visit.
© ALLEN B. DU MONT LABORATORIES, INC.
FLYING SPOT SCANNER
RF WAVEFORM MONITOR
ACORN TRANSMITTER
DUMONT First with the Finest in Television

ALLEN B. DU MONT LABORATORIES, INC., TELEVISION TRANSMITTER DIVISION, CLIFTON, N. J.

Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—SA, SR
Intercall Systems, Inc., 10 Norwood Ave., Dayton 1, Ohio—SF
International Projector Corp., 55 LaFrance Ave., Bloomfield, N. J.—SR
Kellogg Switchboard & Supply Co., 6650 S. Cicero Ave., Chicago, Ill.—SM, SF
Keystone Electronics Co., 50 Franklin St., New York 13, N. Y.—SA
K-F Development Co., 820 Woodside Way, San Mateo, Calif.—SF
Langevin Mfg. Corp., 37 W. 65th St., New York 23, N. Y.—SA, SR
Libra Film Distributors, 6525 Sunset Blvd., Hollywood 28, Calif.—SA, SE, SM, SS
Livingston Electronic Corp., Livingston, N. J.—SA
Lyman Electronic Corp., 12 Cass St., Springfield 4, Mass.—SF
McClure Talking Pictures, O. J., 1115 W. Washington Blvd., Chicago 7, Ill.—SR
McIntosh Laboratory, Inc., 910 King St., Silver Spring, Md.—SR
Magnetic Recorders Co., 7120 Melrose Ave., Los Angeles 46, Calif.—SA, SC, SM, SS, SR
Maurer, Inc., J. A., 37-01 31st St., Long Island City 1, N. Y.—SS
Meletron Corp., 950 N. Highland Ave., Los Angeles, Calif.—SS
Miles Reproducer Co., 812 Broadway, New York 3, N. Y.—SM, SS
Minnesota Electronics Corp., 97 E. 5th St., St. Paul 1, Minn.—SA, SR
Modern Telephone Corp., 509 Madison Ave., New York 22, N. Y.—SF
Modulation Products Co., 92 East End Ave., New York, N. Y.—SR
Motiograph, Inc., 4431 W. Lake St., Chicago, Ill.—SR
Natl. Electrical Machine Shops, 919 Jesup-Blair Dr., Silver Spring, Md.—SA
National Inter-Communicating Systems, 1531 Devon Ave., Chicago 26, Ill.—SF
Neptune Electronics Co., 433 Broadway, New York 13, N. Y.—SA
Newcomb Audio Products Co., 6824 Lexington Ave., Hollywood 38, Calif.—SR
Oleson Co., Otto K., 1534 Cahuenga Blvd., Hollywood 28, Calif.—SS
Operadio Mfg. Co., St. Charles, Ill.—SM
Pentron Corp., 611 W. Division St., Chicago 10, Ill.—SR
Perm-O-Flux Corp., 4900 W. Grand Ave., Chicago 39, Ill.—SA, SM
Pickering & Co., Oceanside, N. Y.—SA
Polarad Electronics Corp., 100 Metropolitan Ave., Brooklyn 11, N. Y.—SD
Precision Electronics, 641 Milwaukee Ave., Chicago 22, Ill.—SA
Racon Electric Co., 52 E. 19 St., New York, N. Y.—SM
Radio Corp. of America, RCA-Victor Div., Camden, N. J.—SA, SE, SC, SM, SS, SR
Radio-Music Corp., 84 S. Water St., Port Chester, N. Y.—SA, SE, SC, SR
Rauland-Borg Corp., 3523 W. Addison St., Chicago 18, Ill.—SF, SR
Raytheon Mfg. Co., 138 River St., Waltham, Mass.—SA, SC
Reeves-Hoffman Corp., 321 Cherry St., Carlisle, Pa.—SC
Roanwell Corp., 662 Pacific St., Brooklyn 17, N. Y.—SM, SS
St. Louis Microphone Co., 2726 Brentwood Blvd., St. Louis, 17, Mo.—SM
Scott, Inc., Herman Hosmer, 385 Putnam Ave., Cambridge 39, Mass.—SA
Shure Bros., 225 W. Huron St., Chicago 10, Ill.—SM
Simplophone Corp. of America, 303 Fifth Ave., New York 16, N. Y.—SF
Simpson Mfg. Co., Mark, 32-28 49 St., Long Island City 3, N. Y.—SA, SR
Sonotone Corp., Elmsford, N. Y.—SM
Special Products Co., 9115 Brookville Rd., Silver Spring, Md.—SS
Spellman Television Corp., 3029 Webster Ave., Bronx, N. Y.—SM
Srepco, Inc., 135 E. 2nd St., Dayton 2, Ohio—SA, SB
Stancil-Hoffman Corp., 1016 N. Highland Ave., Hollywood 38, Calif.—SA, SM, SS, SR
Stephens Mfg. Corp., 8538 Warner Dr., Culver City, Calif.—SM, SR
Stromberg-Carlson Co., 100 Carlson Rd., Rochester 3, N. Y.—SR
Talk-A-Phone Co., 1512 S. Pulaski Rd., Chicago 23, Ill. SF
Tech Laboratories, Inc., Bergen & Edsall Blvds., Palisades Park, N. J.—SA
Thordarson Electric Mfg. Div., Maguire Industries, Inc., 500 W. Huron St., Chicago 10, Ill.—SA
Transmitter Equip. Mfg. Co., 345 Hudson St., New York 14, N. Y.—SC
Turner Co., 909 17 St. N. E., Cedar Rapids, Iowa—SM
U. S. Recording Co., 1121 Vermont Ave., N. W., Washton 5, D. C.—SE, SC
University Loudspeakers, Inc., 80 S. Kensico Ave., White Plains, N. Y.—SA, SR, SM
Univox Corp., 83 Murray Sts., New York 7, N. Y.—SR
Valco Mfg. Co., 4700 W. Walton, Chicago 51, Ill.—SM
Warren Mfg. Co., 250 East St., E. Haven, Conn.—SA
Western Sound & Electric Labs, 805 S. 5th St., Milwaukee, Wisc.—SR
Westrex Corp., 111 Eighth Ave., New York, N. Y.—SR
Winslow Co., 9 Liberty St., Newark 5, N. J.—SA



What? You haven't met **MIKE GIRAFFE?***

Your best buy in microphone booms.
Telescopes from 6' 10" to 18'.
Direction of Mike remotely controllable.
Dolly folds for compact portability.

Used in all major networks and many independent stations in U. S., Canada and overseas. Can do a giant's work in the studio but takes no more room than a midget in your mobile unit.

Price, Boom Only	$300.00
Senior Dolly	50.00
Super Dolly	85.00

For information on TV lighting equipment see our advertisement on page 55 or write for descriptive literature.

*T. M. Registered

DISPLAY LIGHTING INCORPORATED 417 EAST 61st STREET - NEW YORK 21, N. Y.

10—Film

TV film cameras ..... **FC**
TV film camera controls ..... **FV**
TV projectors:
Film ..... **FF**
Kaleidoscope ..... **FK**
Rear screen ..... **FR**
Slide ..... **FS**
Special purpose ..... **FP**
Special effects equipment ..... **FE**

Affiliated Photographic Co, 21 W. 45th St., New York 19, N. Y.—FS
Akeley Camera & Instrument Corp., 175 Varick St., New York 14, N. Y.—FC, FV, FK, FS, FP, FE
American Film Co., 1329 Vine St., Philadelphia 7, Pa.—FF, FP
American Film Registry, 28 E. Jackson Blvd., Chicago 4, Ill.—FF, FS
American Optical Co., Box A, Buffalo 15, N. Y.—FF, FK, FR, FS, FP, FE
Ampro Corp., 2835 N. Western Ave., Chicago 18, Ill.—FF, FS
Ballantyne Co., 1707 Davenport St., Omaha 2, Nebr.—FF
Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N. Y.—FS
Beeland Co., Charles D., Walton Bldg., Atlanta 3, Ga.—FF
Bell & Howell Co., 7100 McCormick Rd., Chicago 45, Ill.—FF, FR, FS, FP, FE
Black Light Products, 67 E. Lake St., Chicago 1, Ill.—FE
Brandon Films, 1700 Broadway, New York 19, N. Y.—FF
Brenkert Light Projection Co., 6545 St. Antoine Ave., Detroit, Mich.—FS
Camera Equipment Co., 1600 Broadway, New York 19, N. Y.—FE
Capitol Stage Lighting Co., 527 W. 45 St., New York 19, N. Y.—FE
Century Projector Corp., 729 Seventh Ave., New York 19, N. Y.—FF, FR, FP
Cineffects, Inc., 115 W. 45th St., New York 19, N. Y.—FP, FE
Clarke Instrument Corp., 910 King St., Silver Spring, Md.—FS, FP
Da-Lite Screen Co., 2711 N. Pulaski Rd., Chicago 39, Ill.—FE
Dallons Laboratories, 5066 Santa Monica Blvd., Los Angeles 27, Calif.—FE
DeVry Corp., 1111 Armitage Ave., Chicago 14, Ill.—FF, FP
DuMont Lab. Inc., Allen B., 1000 Main Ave., Clifton, N. J.—FC, FV, FF, FR, FS, FP, FE, FA (See ad P. 51)
Eastman Kodak Co., 343 State St., Rochester 4, N. Y.—FF, FS, FE
Federal Telecommunication Laboratories, 500 Washington Ave., Nutley 10, N. J.—FS, FP
Feiler Engineering Co., 945 W. George St., Chicago 14, Ill.—FP
Flexon Products Corp., 249 W. 34 St., New York 1, N. Y.—FE
Gale Dorothea Mechanisms, 37-61 85 St., Jackson Heights, L. I., N. Y.—FS, FP, FE
General Electric Co., Electronics Dept., Syracuse, N. Y.—FC, FV, FF, FS, FE, FK
General Precision Laboratory, 63 Bedford Rd., Pleasantville, N. Y.—FC, FV, FF, FR, FS, FP, FE (See ad P. 53)
Golde Mfg. Co., 1214 W. Madison St., Chicago 7, Ill.—FF, FR, FS, FP, FE
Gray Research & Development Co., 15 Arbor St., Hartford 1, Conn.—FS, FP, FE
Holmes Projector Co., 1815 Orchard St., Chicago 14, Ill.—FF, FR
Industrial Cinema Service, 221 N. LaSalle St., Chicago 1, Ill.—FF
International Movie Producers' Service, 515 Madison Ave., New York 22, N. Y.—FK, FS
International News Service, TV Dept., 235 E. 45 St., New York 17, N. Y.—FS, FP, FE
Libra Film Distributors, 6525 Sunset Blvd., Hollywood 28, Calif.—FK, FR, FP, FE
McClure Talking Pictures, O. J., 1115 W. Washington Blvd., Chicago 7, Ill.—FK, FS, FP
Maurer, Inc., J A., 37-01 31st St., Long Island City 1, N. Y.—FF, FR
Michigan Film Library, 15745 Rosemont, Detroit 23, Mich.—FF, FS
Micro Engineering Corp., 15 E. Tujunga Ave., Burbank, Calif.—FC, FV, FF, FK, FR, FS, FP, FE
Mitchell Camera Corp., 666 W. Harvard St., Glendale 4, Calif.—FF
Motiograph Inc., 4431 W. Lake St., Chicago 24, Ill.—FF
Movie-Mite Corp., 1105 Truman Rd., Kansas City 6, Mo.—FF
Natco, 4401 W. North Ave., Chicago 39, Ill.—FF
National Cine Equipment, Inc., 20 W. 22nd St., New York 10, N. Y.—FE
National Sound Projector, 8044 N. Ridgeway, Skokie, Ill.—FF
Nemeth Studios, Ted, 729 Seventh Ave., New York 19, N. Y.—FF, FP, FE
North American Philips Co., 100 E. 42 St., New York 17, N. Y.—FF

3 Good Reasons *why* General Precision Laboratory Incorporated Products

Model PA-100

Model PA-101

Are Superior For

TV BROADCAST EQUIPMENT

❶ Telecast Projector Model PA-100

Professional, ruggedly constructed 16mm projector provides clean-cut, bright pictures and high-fidelity sound reproduction.

Features . . .

- Sound frequency response flat to 7000 cyc.
- Sound flutter kept to an absolute minimum — less than 0.2%. Separate hold-back sprocket.
- Separate phasing over 300 mechanical degrees.
- Sprocket intermittent of rugged construction, operates at low speed of 120 RPM, assuring longest life of mechanism.
- Optical system resolves better than 90 lines per mm. Screen image uniformly bright—corner illumination is at least 90% of that at center.
- Film gate and optical components easily removed for cleaning.

❷ Utility TV Projector Model PA-101

Versatile telecasting at remotes (commercials at games, etc.), for previewing films, for background projection up to 4' x 5' screen, and for telecasting with an image orthicon camera for the TV pickup. Ideal equipment for small stations and extremely useful for larger TV broadcasters as auxiliary equipment.

Features . . .

- A 2-3 sprocket movement in conjunction with shutter and optical system provide sufficient light passage (better than 390 lumens) with practically no wear for mechanism and no film damage.
- A quiet sprocket intermittent runs in an oil bath.
- Corner illumination 90% of center.
- Pre-amplifier output level (reference 6 milliwatts) in a 500-ohm circuit. Output impedance of 600/500, 323, 250/200, 150/125, and 50 ohms, for connection to existing sound system. Includes RF exciter lamp supply.
- Sound system 20-watt output. Frequency response flat from 50 to 7000 CPS.

❸ Video Recording System Model VA-100

A complete TV high-quality monitor recording system using stable electronic shutter produces standard 16mm, 24-frames-per-second motion picture sound film. Designed for standard TV transmission pickup.

- We can modify our standard equipment for specific needs.

GENERAL PRECISION LABORATORY INCORPORATED

PLEASANTVILLE NEW YORK

Camera chain — Film chain — Field & Studio Equipment — Theater TV Equipment

Perkin-Elmer Corp., P. O. Box 331, Glenbrook, Conn.—FR, FP
Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.—FS, FP, FE
Princeton Film Center, Princeton, N. J.—FS, FP, FE
Producers Service Co., 2815 W. Olive Ave., Burbank, Calif.—FC, FR, FE, FP
Radio Corp. of America, RCA-Victor Div., Camden, N. J.—FC, FV, FF, FK, FS, FP, FE
Society for Visual Education, 1345 W. Diversey Pkwy., Chicago 14, Ill.—FS, FP
Swank Films, 19 W. Fourth St., Dayton 2, Ohio—FS, FF
Television Associates, Inc., 225 N. Michigan Ave., Chicago, Ill.—FE
Television Cartoons, Inc., 361 W. Broadway, New York 13, N. Y.—FF, FE
Televisor Co., 515 Madison Ave., New York 22, N. Y.—FR, FS
Trans-Lux Corp., 1270 6th Ave., New York, N. Y.—FR, FP, FE
Tressel Television Productions, 2214 E. 75 St., Chicago 49, Ill.—FF, FS, FP, FE
Victor Animatograph Corp., Hickory Grove Rd., Davenport, Iowa—FF
Viewlex, Inc., 35-01 Queens Blvd., Long Island City 1, N. Y.—FP, FF, FK, FR, FS, FE
Webster-Chicago Corp., 5610 W. Bloomingdale Ave., Chicago 34, Ill.—FC, FV, FP, FE
Wenzel Projector Co., 2509 S. State St., Chicago 16, Ill.—FF
Woodruff Associates, 328 E. 38 St., New York 16, N. Y.—FE

11—Lighting

- Accessories & supplies ..... DA
- Black lights ..... DB
- Control consols ..... DC
- Dimmers ..... DH
- Fluorescent ..... DF
- Fluorescent pigment ..... DD
- Gobos ..... DG
- Incandescent ..... DI
- Light meters ..... DE
- Mercury arc ..... DM
- Portable lighting kits ..... DX
- Power supplies ..... DS
- Studio rigging ..... DR

Adam Electric Co., Frank, 3650 Windsor Pl., St. Louis, Mo.—DH
Adams Lighting Co., 48 W. 27 St., New York 1, N. Y.—DA, DI, DF
Advance Transformer Co., 1122 W. Catalpa Ave., Chicago 40, Ill.—DA
Aerolux Light Corp., 653 11th Ave., New York 19, N. Y.—DF
Art Specialty Co., 3245 W. Lake St., Chicago 24, Ill.—DA, DI, DF
Beeland Co., Charles D., Walton Bldg., Atlanta 3, Ga.—DA, DI
Black Light Products, 67 E. Lake St., Chicago 1, Ill.—DD, DF, DB
Brenkert Light Projection Co., 6545 St. Antoine St., Detroit, Mich.—DI
Camera Equipment Co., 1600 Broadway, New York 19, N. Y.—DA
Camera Mart, Inc., 70 W. 45th St., New York 19, N. Y.—DA
Capitol Stage Lighting Co., 527 W. 45 St., New York 19, N. Y.—DA, DI, DC, DF, DR, DH, DX
Century Lighting, 419 W. 55th St., New York 19, N. Y.—DA, DI, DC, DF, DR, DH
Color Tran Converter Co., 7045 Romaine, Hollywood 38, Calif.—DA, DI, DC, DG, DS, DX, DH
Compco Corp., 2251 W. St. Paul Ave., Chicago 47, Ill.—DA, DI, DF
Curtis Lighting, Inc., 6135 W. 65 St., Chicago 38, Ill.—DI, DF
Cutler-Hammer, Inc., 315 N. 12th St., Milwaukee 1, Wisc.—DH
Dallons Laboratories, 5066 Santa Monica Blvd., Los Angeles 27, Calif.—DB, DM
Display Lighting, Inc., 417 E. 61st St., New York 21, N. Y.—DA, DI, DG, DR (See ad P. 55)
DuMont Labs, Inc., Allen B., 1000 Main Ave., Clifton, N. J.—DA, DI, DC, DF, DH
Fischer-Pierce Co., 70 Ceylon St., Boston 21, Mass.—DA
Falstrom Co., Falstrom Court, Passaic, N. J.—DC
Gale Dorothea Mechanisms, 37-61 85 St., Jackson Heights, L. I., N. Y.—DA, DC, DH
General Electric Co., Electronics Dept. Syracuse, N. Y.—DA, DI, DC, DF, DG, DH
General Electronics, Inc., 101 Hazel St., Paterson, N. J.—DF
Golde Mfg. Co., 1214 W. Madison St., Chicago 7, Ill.—DA, DI
Guth Co., Edward F., 2615 Washington Blvd., St. Louis 3, Mo.—DF, DI
Huggins Laboratories, 700 Hamilton Ave., Menlo Park, Calif.—DM, DS, DF
Hughey & Phillips, 326 N. La Cienega Blvd., Los Angeles 48, Calif.—DA, DI
International Movie Producers' Service, 515 Madison Ave., New York 22, N. Y.—DA, DI, DG
Keese Engineering Co., 7358 Santa Monica Blvd., Hollywood 46, Calif.—DF, DB, DD, DM
Keystone Electronics Co., 50 Franklin St., New York 13, N. Y.—DA
Kliegl Bros., 321 W. 50th St., New York 19, N. Y.—DA, DI, DC, DF, DG, DR, DH, DS (See ad P. 55)
Libra Film Distributors, 6525 Sunset Blvd., Hollywood 28, Calif.—DA, DI, DC
Maurer, Inc., J. A., 37-01 31st St., Long Island City 1, N. Y.—DA, DI
Micro Engineering Corp., 15 E. Tujunga Ave., Burbank, Calif.—DA
Mole-Richardson Co., 937 N. Sycamore Ave., Hollywood 38, Calif.—DA, DI, DH
Moulic Specialties Co., 1005 W. Washington St., Bloomington, Ill.—DF
National Cine Equipment, Inc., 20 W. 22nd St., New York 10, N. Y.—DA, DG
North American Electric Lamp Co., 1014 Tyler St., St. Louis 6, Mo.—DI
Oleson Co., Otto K., 1534 Cahuenga Blvd., Hollywood 28, Calif.—DA, DI, DC, DF, DG, DM
Onan & Sons, D. W., 43 Royalston, Minneapolis 5, Minn.—DS
Petrick Bros., 1938 N. Springfield Ave., Chicago 47, Ill.—DA
Photo Research Corp., 127 W. Alameda Ave., Burbank, Calif.—DE
Photovolt Corp., 95 Madison Ave., New York 16, N. Y.—DE
Radiant Lamp Corp., 300 Jelliff Ave., Newark 8, N. J.—DI
Radio Corp. of America, RCA Victor Div., Camden, N. J.—DA, DI, DC, DF
Stroblite Co., 35 W. 52 St., New York, N. Y.—DA, DH, DI, DD, DB
Strong Electric Corp., 3 City Park Ave., Toledo 2, Ohio—DI, DX, DS, DF, DC, DH
Super Electric Products Corp., 1057 Summit Ave., Jersey City, N. J.—DH
Superior Electric Co., 83 Laurel St., Bristol, Conn.—DC, DH
Swank Films, 19 W. Fourth St., Dayton 2, Ohio—DA, DI
Switzer Bros., 1220 Huron Rd., Cleveland 15, Ohio—DB, DD
Sylvania Electric Products Co., 1740 Broadway, New York 19, N. Y.—DA, DI, DF
U. S. Motors Corp., 584 Nebraska St., Oshkosh, Wisc.—DS
Ward Leonard Electric Co., 115 S. McQuesten Pkwy., Mt. Vernon, N. Y.—DH
Westinghouse Electric Corp., Construction & Communications Sec 10-L E. Pittsburgh, Pa.—DA, DI, DF
Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark 5, N. J.—DB
Winslow Co., 9 Liberty St., Newark 5, N. J.—DA
Woodruff Associates, 328 E. 38 St., New York 16, N. Y.—DI

12—Motion Picture Equipment

- Cameras 35 m/m ..... GT
- Cameras, 16 m/m ..... GC
- Animation, titling, spec'l effects ..... GA
- Editing & Splicing ..... GE
- Film, raw stock ..... GL
- Film scraper ..... GU
- Film storage ..... GF
- Kinescope recording apparatus ..... GV
- Lenses ..... GN
- Cue markers ..... GI
- Optical apparatus ..... GO
- Printing ..... GP
- Processing ..... GR
- Rear projectors ..... GH
- Continuous projection reel ..... GM
- Sound reader ..... GS
- Auto rewinds ..... GJ
- Background screens ..... GG
- Projection screens ..... GB
- Viewfinders ..... GD

Ace Electric Mfg. Co., 1458 Shakespeare Ave., New York 52, N. Y.—GU, GB
Akeley Camera & Instrument Corp., 175 Varick St., New York 14, N. Y.—GA, GE, GN, GT, GC
American Bolex Co., 265 Madison Ave., New York, N. Y.—GC, GD
American Film Co., 1329 Vine St., Philadelphia 7, Pa.—GE, GF, GR, GC, GT
American Film Registry, 28 E. Jackson Blvd., Chicago 4, Ill.—GR
Ansco Div., General Aniline & Film Corp., Binghamton, N. Y.—GL
Bache & Co., Semon, Greenwich & Morton Sts., New York 14, N. Y.—GN
Back Video Corp., F. G., 500 Fifth Ave., New York 18, N. Y.—GN
Baia Motion Picture Engineering, 120 Victor Ave., Detroit 3, Mich.—GE
Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N. Y.—GN
Beeland Co., Charles D., Walton Bldg., Atlanta 3, Ga.—GC, GA, GE, GN
Bell & Howell Co., 7100 McCormick Rd., Chicago 45, Ill.—GC, GA, GE, GP, GN, GJ GD, GO, GU, GT
Berndt-Bach, Inc., 7377 Beverly Blvd., Los Angeles 36, Calif.—GC, GE, GP, GN
Brumberger Co., 34 34th St., Brooklyn 32, N. Y.—GF
Buhl Optical Co., 1009 Beech Ave., Pittsburgh 12, Pa.—GN
Burke & James, 321 S. Wabash Ave., Chicago, Ill.—GN
Century Projector Corp., 729 Seventh Ave., New York 19, N. Y.—GA, GE
Cineffects, Inc., 115 W. 45th St., New York 19, N. Y.—GA, GE, GP, GN
Cinema Research Corp., 7000 Romaine St., Hollywood 38, Calif.—GA, GE, GP, GR
Cinetech Co., 106 West End Ave., New York 23, N. Y.—GC, GT
Colonial Films, 2118 Mass. Ave. N. W., Washington 8, D. C.—GC, GA, GE, GF, GP, GR, GL, GC, GT
Compco Corp., 2251 W. St. Paul Ave., Chicago 47, Ill.—GF
Consolidated Production, 540 W. Congress St., Detroit 26 Mich.—GC, GT
Cummins Business Machines Corp., 4740 Ravenswood Ave., Chicago 40, Ill.—GI
Da-Lite Screen Co., 2711 N. Pulaski Rd., Chicago 39, Ill.—GG
DeVry Corp., 1111 Armitage Ave., Chicago 14, Ill.—GC, GT
DuMont Laboratories, Allen B., 1000 Main Ave., Clifton, N. J.—GN
DuPont de Nemours & Co., Inc., E. I., Wilmington, Dela.—GL
Duotone Co., Locust St., Keyport, N. J.—GN
Eastman Kodak Co., 343 State St., Rochester 4, N. Y.—GC, GE, GF, GL, GN, GV, GB, GU, GT, GD GO
E D L Co., 2007 S. Michigan Ave., Chicago 16, Ill.—GE, GR, GS
Feiler Engineering Co., 945 W. George St., Chicago 14, Ill.—GA
Filmack Corp., 1327 S. Wabash Ave., Chicago 5, Ill.—GA, GE, GF, GP, GR, GL
Film Associates, Inc., 440 E. Schantz Ave., Dayton 9, Ohio—GA, GE, GF, GP, GR, GL
Fisher Co., Oscar, 109 Worth St., New York 13, N. Y.—GR
Fish-Schurman Corp., 230 E. 45th St., New York 17, N. Y.—GO, GN
Gale Dorothea Mechanisms, 37-61 85th St., Jackson Heights, L. I., N. Y.—GA
General Precision Laboratory, 63 Bedford Rd., Pleasantville, N. Y.—GR, GV
Goldberg Bros., 1745 Wazee St., Denver, Colo.—GJ
Golde Mfg. Co., 1214 W. Madison St., Chicago 7, Ill.—GE, GJ
Griswold Machine Works, 412 Main St., Port Jefferson, N. Y.—GE
Gundlach Mfg. Corp., Fairport, N. Y.—GN
Holmes Projector Co., 1815 Orchard St., Chicago 14, Ill.—GH
Houston Corp., 11801 W. Olympic Blvd., Los Angeles 25, Calif.—GP, GR
Industrial Cinema Service, 221 N. La Salle St., Chicago 1, Ill.—GE GF GP, GR, GL, GN, GO, GB, GC
International Movie Producers' Service, 515 Madison Ave., New York 22, N. Y.—GC, GE, GN
Kin-O-Lux, Inc., 105 W. 40th St., New York 18, N. Y.—GP, GR, GL
Kollmorgen Optical Corp., 2 Franklin Ave., Brooklyn 11, N. Y.—GN
Lektra Laboratories, 30 E. 10th St., New York 3, N. Y.—GE
Libra Film Distributors, 6525 Sunset Blvd., Hollywood 28, Calif.—GA, GE, GF, GP, GR
Maurer, Inc., J. A., 37-01 31st St., Long Island City 1, N. Y.—GC, GA, GP, GR, GN, GT
Michigan Film Library, 15745 Rosemount, Detroit 23, Mich.—GC, GE, GF, GP, GR, GN, GL
Micro Engineering Corp., 15 E. Tujunga Ave., Burbank, Calif.—GC, GA, GE, GF, GP, GR, GL GN, GT
Mitchell Camera Corp., 666 W. Harvard St., Glendale 4, Calif.—GC, GN, GT
Morton Co., 86 S. 6th St., Minneapolis 2, Minn.—GC
Moviola Mfg. Co., 1451 Gordon St., Hollywood 28, Calif.—GE, GS
National Cine Equipment, Inc., 20 W. 22nd St., New York 10, N. Y.—GC, GA, GE, GN, GT
National Sound Projector, 8044 N. Ridgeway, Skokie, Ill.—GN
Nemeth Studios, Ted, 729 Seventh Ave., New York 19, N. Y.—GE, GL
Neumade Products Corp., 330 W. 42nd St., New York 18, N. Y.—GE, GF, GU, GI
Pancro Mirrors, Inc., 2958 Los Feliz Blvd., Los Angeles 39, Calif.—GN
Paramount TV Productions, 1501 Broadway, New York 18, N. Y.—GV
Peerless Film Processing Corp., 165 W. 46th St., New York 19, N. Y.—GR
Perkin-Elmer Corp., P. O. Box 331, Glenbrook, Conn.—GN
Photo Research Corp., 127 W. Alameda Ave., Burbank, Calif.—GD
Precision Products Inc., 719 17 St. N. W. Washington, D. C.—GN, GR, GC

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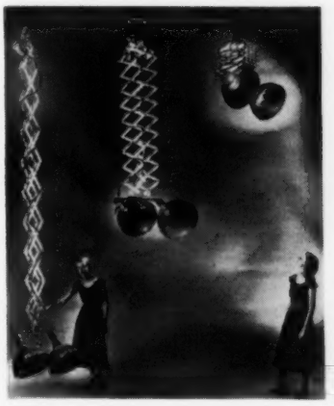

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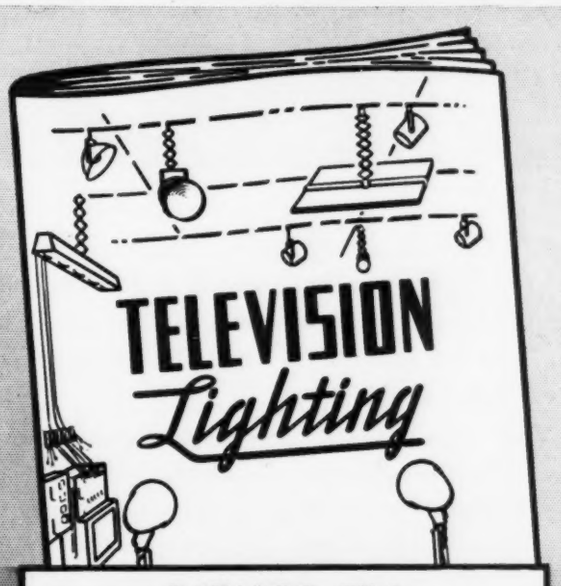

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Prestoseal Mfg. Corp., 38-01 Queens Blvd., Long Island City, N. Y.—GE
Producers Service Co., 2815 W. Olive Ave., Burbank, Calif.—GC, GA, GP, GV, GT
Projection Optics Co., 330 Lyell Ave., Rochester 6, N. Y.—GN
Radiant Mfg. Corp., 2627 W. Roosevelt Rd., Chicago 8, Ill.—GB
Radio Corp. of America, RCA-Victor Div., Camden, N. J.—GR, GN, GV
Raven Screen Corp., 124 E. 124th St., New York 35, N. Y.—GG, GB
Republic Lens Co., 916 Ninth Ave., New York 19, N. Y.—GN
Saftee Glass Co, 4717 Stenton Ave., Philadelphia 44, Pa.—GN
Sanders, Sidney A., 1036 Wooster St., Los Angeles 35, Calif.—GG
Simpson Optical Mfg. Co., 3200 W. Carroll Ave., Chicago 24, Ill.—GN, GO
Spellman Television Co., Inc., 3029 Webster Ave., Bronx, N. Y.—GN
Swank Films, 19 W. Fourth St., Dayton 2, Ohio—GA, GE, GF, GP, GR, GL, GN, GC, GT
Television Associates, Inc., 225 N. Michigan Ave., Chicago, Ill.—GA, GM
Television Cartoons, Inc., 361 W. Broadway, New York 13, N. Y.—GC, GA, GE, GL, GN, GT
Televisor Co., 515 Madison Ave., New York 22, N. Y.—GB, GG
Trans-Lux Corp, 1270 Seventh Ave., New York, N. Y.—GG, GB, GN
Universal Reels, 9-16 37 St., Long Island City, N. Y.—GM
Victor Animatograph Corp., Hickory Grove Rd., Davenport, Iowa—GC, GT
Victorlite Industries, Inc., 5350 Second Ave., Los Angeles 43, Calif.—GG
Vocalite Screen Corp., 19 Debevoise Ave., Roosevelt, N. Y.—GR
Wenzel Projector Co., 2509 S. State St., Chicago 16, Ill.—GT
Williams Screen Co., 1620 Summit Blvd., Akron, Ohio—GB
Woodruff Associates, 328 E. 38 St., New York 16, N. Y. GA, GE
Zenith Optical Laboratory, 123, W. 64 St., New York 23, N. Y.—GN, GO

13—Remote Pickup—Video

Accessories ..... **WA**
Antennas ..... **WB**
Field Cameras ..... **WF**
Camera controls ..... **WC**
Dollies ..... **WD**
Sync. generators ..... **WG**
Wave Guides ..... **WE**
Lenses ..... **WL**
Microwave receivers ..... **WM**
Camera switching systems ..... **WS**
Power supplies ..... **WP**
Microwave transmitters ..... **WT**
Tripods ..... **WK**

Accurate Engineering Co., 2005 Blue Island Ave., Chicago 8, Ill.—WP
Airtron, Inc., 540 Bloomingdale Rd., Pleasant Plains, S. I., N. Y.—WE
Akeley Camera & Instrument Corp., 175 Varick St., New York 14, N. Y.—WF, WC, WD, WL, WS, WK
American Electroneering Co., 2112 S. LaBrea, Los Angeles 16, Calif.—WP
American Television & Radio Co., 300 E. 4th St., St. Paul 1, Minn.—WP
Andrew Corp., 363 E. 75th St., Chicago 19, Ill.—WB
Bache & Co., Semon, Greenwich & Morton Sts., New York 14, N. Y.—WL
Back Video Corp., F. G., 500 Fifth Ave., New York 18, N. Y.—WL
Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N. Y.—WL
Bell & Howell Co., 7100 McCormick Rd., Chicago 45, Ill.—WL, WK
Bendix Aviation Corp., Eclipse-Pioneer Div., Teterboro, N. J.—WA
Berndt-Bach, Inc., 7377 Beverly Blvd., Los Angeles 36, Calif.—WD, WK, WL
Beta Electric Corp., 1762 3rd Ave., New York 29, N. Y.—WP
Buhl Optical Co., 1009 Beech Ave., Pittsburgh 12, Pa.—WL
Burke & James, 321 S. Wabash Ave., Chicago, Ill.—WL
Camera Equipment Co., 1600 Broadway, New York 19, N. Y.—WK (See ad P. 48)
Canoga Corp., 14315 Bessemer St., Van Nuys, Calif.—WM
Da-Lite Screen Co., 2711 N. Pulaski Rd., Chicago 39, Ill.—WA, WK
Dalmo Victor Co., 1414 El Camino Real, San Carlos, Calif.—WM, WT
Display Lighting, Inc., 417 E. 61st St., New York 21, N. Y.—WD, WK
DuMont Labs. Inc., Allen B., 1000 Main Ave., Clifton, N. J.—WA, WF, WC, WD, WG, WL, WM, WS, WP, WT, WK
Duotone Co., Locust St., Keyport, N. J.—WL
Eastman Kodak Co., 343 State St., Rochester 4, N. Y.—WL
Electronic Measurements Co., Box 850, Red Bank, N. J.—WM, WP
Empire State Laboratories, 161 Maiden Lane, New York 7, N. Y.—WE
Federal Telecommunication Laboratories, 500 Washington Ave., Nutley 10, N. J.—WM, WP, WT
Federal Telephone & Radio Corp., 100 Kingsland Rd., Cliffton, N. J.—WG, WM, WP, WT
General Electric Co., Electronics Dept., Syracuse, N. Y.—WA, WF, WC, WD, WG, WL, WM, WS, WP, WT, WK, WE, WB
General Precision Laboratory, 63 Bedford Rd., Pleasantville, N. Y.—WF, WC, WG, WL, WS
Gundlach Mfg. Corp., Fairport, N. Y.—WL
Hamilton Electronics, 2726 Pratt Ave., Chicago 45, Ill.—WP
Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—WT
Hunton Plastics Co., 178 S. Van Brunt St., Englewood, N. J.—WL
Industrial Electrical Works, 1509 Chicago St., Omaha 2, Nebr.—WA
Industrial Electronics, 2457 Woodward Ave., Detroit 1, Mich.—WP
J. & A. Television & Mfg. Co., 5066 Broadway, Chicago 40, Ill.—WG
Jamaica Television Mfg. Co., 95-26 Sutphin Blvd., Jamaica 4, L. I., N. Y.—WF, WC, WG, WS, WP, WT
Kepco Laboratories, 149-14 41st Ave., Flushing, N. Y.—WP
Kollmorgen Optical Corp., 2 Franklin Ave., Brooklyn 11, N. Y.—WL
Lambda Electronics Corp., 103-02 Northern Blvd., Corona, L. I., N. Y.—WP
Libra Film Distributors, 6525 Sunset Blvd., Hollywood 28, Calif.—WA, WF, WC, WD, WL, WS, WP, WK
Micro Engineering Corp., 15 E. Tujunga Ave., Burbank, Calif.—WA, WF, WC, WD, WG, WL, WM, WS, WP, WT, WK
Microwave Equipment Co., Greenbrook Rd., Caldwell, N. J.—WE
Millen Mfg. Co., James, 150 Exchange St., Malden 48, Mass.—WP
Mitchell Camera Corp., 666 W. Harvard St., Glendale 4, Calif.—WK
National Cine Equipment, Inc., 20 W. 22nd St., New York 10, N. Y.—WA, WD, WL, WK
Onan & Sons, D. W., Minneapolis, Minn.—WP
Pancro Mirrors, Inc., 2958 Los Feliz Blvd., Los Angeles 39, Calif.—WL
Perkin-Elmer Corp., P. O. Box 331, Glenbrook, Conn.—WL
Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.—WM, WP, WT
Polarad Electronics Corp., 100 Metropolitan Ave., Brooklyn 11, N. Y.—WA, WF, WC, WG, WS, WP
Precision Products, Inc., 719 17 St. N. W., Washington, D. C.—WF, WL
Projection Optics Co., 330 Lyell Ave., Rochester 3, N. Y.—WL
Radio Corp. of America, RCA Victor Div., Camden, N. J.—WA, WF, WC, WD, WG, WL, WM, WS, WP, WT, WK
Raytheon Mfg. Co., 138 River St., Waltham 54, Mass.—WM, WT, WB, WE
Republic Lens Co., 916 Ninth Ave., New York 19, N. Y.—WL
Roanwell Corp., 662 Pacific St., Brooklyn 17, N. Y.—WC
Saftee Glass Co., 4717 Stenton Ave., Philadelphia 44, Pa.—WL
Spellman Television Corp., 3029 Webster Ave., New York 67, N. Y.—WP
Sperry Gyroscope Co., Div. Sperry Corp., Great Neck, L. I., N. Y.—WM, WP, WT, WB, WE
Telectro Industries Corp., 36-16 37th St., Long Island City 1, N. Y.—WA, WM, WT
Television Equipment Corp., 238 William St., New York 7, N. Y.—WA, WF, WC, WG
Terpening Co., L. H., 16 W. 61 St., New York 23, N. Y.—WE
Thordarson Electric Mfg. Div., Maguire Industries, Inc., 500 W. Huron St., Chicago 10, Ill.—WP
Titeflex, Inc., 500 Frelinghuysen Ave., Newark 5, N. J.—WE, WB
Weston Laboratories, 410 Glen Rd., Weston 93, Mass.—WP
Weymouth Instrument Co., 1440 Commercial St., E. Weymouth 89, Mass.—WM, WT, WE
Winslow Co., 9 Liberty St., Newark 5, N. J.—WA

14—Remote Pickup—Audio

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DC to AC converters ..... **BM**
Remote mixing equipment ..... **BR**
Cue receivers ..... **BC**
Auxiliary power supplies ..... **BP**
Transmitters ..... **BT**

Accurate Engineering Co., 2005 Blue Island Ave., Chicago 8, Ill.—BP
Altec Lansing Corp., 1161 N. Vine St., Hollywood 38, Calif.—BA, BR, BP
American Communications Corp., 306 Broadway, New York 7, N. Y.—BA, BR, BC, BP
American Electroneering Co., 2112 S. LaBrea, Los Angeles 16, Calif.—BA, BR, BP, BT
Arlington Electric Products, Inc., 500 W. 52nd St., New York 19, N. Y.—BA, BR, BC, BP
Bell Sound Systems, 555 Marion Rd., Columbus 7, Ohio BA
Bunnell & Co., J. H., 81 Prospect St., Brooklyn 1, N. Y.—BA, BP, BT
Carter Motor Co., 2644 N. Maplewood Ave., Chicago 47, Ill.—BB
Collins Radio Co., 855 35th St., N. E., Cedar Rapids, Iowa—BA, BR
Custom Craft Mfg. Co., 256 E. 98th St., Brooklyn 12, N. Y.—BA
Doolittle Radio, Inc., 7421 S. Loomis Blvd., Chicago 36, Ill.—BT
DuMont Lab. Inc., Allen B., 1000 Main Ave., Clifton, N. J.—BA, BR, BP
Electronic Transformer Co., 207 W. 25 St., New York 1, N. Y.—BP
Federal Telephone & Radio Corp., 100 Kingsland Rd., Clifton, N. J.—BA, BR, BT
Gale Dorothea Mechanisms, 37-61 85 St., Jackson Heights, L. I., N. Y.—BA
Gates Radio Co., Quincy, Ill.—BA, BR, BP, BT, BC
Gaveco Laboratories, Inc., 2 East End Ave., New York 21, N. Y.—BP
General Electric Co., Electronics Dept., Syracuse, N. Y.—BA, BR, BP, BT
General Precision Laboratory, 63 Bedford Rd., Pleasantville, N. Y.—BA
Hamilton Electronics, 2726 Pratt Ave., Chicago 45, Ill.—BA, BR, BP
Highland Engineering Co., 32 Holman Blvd., Hicksville, L. I., N. Y.—BA
Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—BA, BR, BC, BP, BT
Jamaica Television Mfg. Co., 95-26 Sutphin Blvd., Jamaica 4, L. I., N. Y.—BA, BR, BC, BT
Lambda Electronics Corp., 103-02 Northern Blvd., Corona, L. I., N. Y.—BP
McIntosh Laboratory, Inc., 910 King St., Silver Spring, Md.—BA
Magnetic Recorders Co., 7120 Melrose Ave., Los Angeles 46, Calif.—BA, BR, BP
Mallory & Co., Inc., P. R., 3029 E. Washington St., Indianapolis 1, Ind.—BP, BM
Miles Reproducer Co, 812 Broadway, New York 3, N. Y.—BA
Minnesota Electronics Corp., 97 E. 5th St., St. Paul 1, Minn.—BA
National Inter-Communicating Systems, 1531 Devon Ave., Chicago 26, Ill.—BA, BR, BP
Neptune Electronics Co., 433 Broadway, New York 13, N. Y.—BA, BP
Onan & Sons, D. W., Minneapolis, Minn.—BP
Orthon Corp., 196 Albion Ave., Paterson 2, N. J.—BA, BC
Pentron Corp., 611 W. Division St., Chicago 10, Ill.—BA
Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.—BC, BT
Precision Electronics, 641 Milwaukee Ave., Chicago 22, Ill.—BA
Presto Recording Corp., P. O. Box 500, Hackensack, N. J.—BA, BR
Radio Corp. of America, RCA Victor Div., Camden, N. J.—BA, BR, BC, BP, BT
Radio Engineering Laboratories Inc., 36-40 37 St., Long Island City 1, N. Y.—BT
Radio-Music Corp., 84 S. Water St., Port Chester, N. Y.—BA, BR
Rauland-Borg Corp., 3523 W. Addison St., Chicago 18, Ill.—BA
Raytheon Mfg. Co., 138 River St., Waltham 54, Mass.—BA, BR
Reeves-Hoffman Corp., 321 Cherry St., Carlisle, Pa.—BA, BR, BT
Simpson Mfg. Co., Mark, 32-28 49 St., Long Island City 3, N. Y.—BA, BR
Sonar Radio Corp., 59 Myrtle Ave., Brooklyn 1, N. Y.—BA
Southwestern Industrial Electronic Co., 2831 Post Oak Rd., Houston 19, Texas—BA, BP
Stancil-Hoffman Corp., 1016 N. Highland Ave., Hollywood 38, Calif.—BA, BR, BP
Stromberg-Carlson Co., 100 Carlson Rd., Rochester 3, N. Y.—BA
Synchrotone Film Sound, Inc., 1776 Broadway, New York 19, N. Y.—BR
Telectro Industries Corp., 35-16 37th St., Long Island City 1, N. Y.—BA, BR, BP
Thordarson Electric Mfg. Div., Maguire Industries, Inc., 500 W. Huron St., Chicago 10, Ill.—BA, BP
Transmitter Equip. Mfg. Co., 345 Hudson St., New York 14, N. Y.—BA, BR, BP, BT
U. S. Recording Co., 1121 Vermont Ave., N. W., Washington 5, D. C.—BA, BR
Univox Corp., 83 Murray St., New York 7, N. Y.—BA, BR
Walkirt Co., 5808 Marilyn Ave., Culver City, Calif.—BA
Webster Electric Co., Clark & DeKoven Aves., Racine, Wisc.—BA
Western Sound & Electric Labs., 805 S. 5th St., Milwaukee, Wisc.—BA, BR
Weston Laboratories, 410 Glen Rd., Weston 93, Mass.—BP

15—Speech Equipment

Amplifiers, cueing ..... HG
Amplifiers, limiting ..... HL
Amplifiers, line ..... HN
Amplifiers, mixing ..... HI
Amplifiers, monitoring ..... HM
Amplifiers, program ..... HP
Amplifiers, remote ..... HR
Amplifiers, recording ..... HD
Pre-amplifiers ..... HA
Consoles, control ..... HC
Consoles, dubbing ..... HB
Equalizers ..... HE
Filters sound effects ..... HF
Jack panels ..... HJ
Power supplies ..... HV
Noise suppressers ..... HH
Switching systems ..... HS

Altec Lansing Corp., 1161 N. Vine St., Hollywood 38, Calif.—HL, HN, HM, HP, HR, HD, HA, HG
American Communications Corp., 306 Broadway, New York 7, N. Y.—HN, HM, HP, HR, HA, HC, HJ, HS
American Electroneering Co., 2112 S. LaBrea, Los Angeles 16, Calif.—HL, HN, HM, HP, HR, HD, HA, HC, HS
Amplifier Corp. of America, 398 Broadway, New York 13, N. Y.—HL, HN, HM, HP, HD, HA, HE, HF
Arlington Electric Products, Inc., 500 W. 52nd St., New York 19, N. Y.—HL, HN, HM, HP, HR, HD, HA, HC, HB, HE, HF, HJ, HS
Astatic Corp., Harbor & Jackson St., Conneaut, Ohio—HE
Audio Development Co., 2833 13th Ave. S., Minneapolis 7, Minn.—HM, HE, HF, HJ
Audio Instrument Co., 420 Lexington Ave., New York 17, N. Y.—HA
Ballantyne Co., 1701 Davenport, Omaha, Nebr.—HP
Barker & Williamson, Inc., 237 Fairfield Ave., Upper Darby, Pa.—HL, HR, HC, HE, HF
Berger Communications, 109-01 72d Rd., Forest Hills, L. I. N. Y.—HP
Bogen Co., David, 663 Broadway, New York, N. Y.—HM, HD
Brociner Electronics Laboratory, 1546 Second Ave., New York 28, N. Y.—HA
Brook Electronics, Inc., 34 DeHart Place, Elizabeth 2, N. J.—HP, HD, HA
Brush Development Co., 3405 Perkins Ave., Cleveland 14, Ohio—HD
Bunnell & Co., J. H., 81 Prospect St., Brooklyn 1, N. Y.—HL, HN, HM, HR, HA, HE, HJ, HS
Burnell & Co., 45 Warburton Ave., Yonkers, N. Y.—HF
Caltron Products, 1406 S. Hobart Blvd., Los Angeles 6, Calif.—HA
Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—HN, HM, HP, HR, HD, HA, HC, HB, HE, HF, HJ
Clarkstan Corp., 11921 W. Pico Blvd., Los Angeles 64, Calif.—HE
Coil Winders, Inc., 61 Bergen St., Brooklyn 2, N. Y.—HE, HF
Collins Radio Co., 855 35th St., N.E., Cedar Rapids, Iowa—HL, HN, HM, HP, HR, HD, HA, HC, HB, HE, HF, HJ, HS, HI
Communication Accessories Co., Hickman Mills, Mo.—HE, HF
Communications Co., 300 Greco Ave., Coral Gables, Fla.—HA
Conn, Telephone & Electric Corp., 70 Brittania St., Meriden, Conn.—HJ, HS
Custom Craft Mfg. Co., 256 E. 96th St., Brooklyn 12, N. Y.—HM, HR, HD
Daven Co., 191 Central Ave., Newark 4, N. J.—HE, HF
DeCoursey Engineering Laboratory, P.O. Box 235, Los Angeles 25, Calif.—HF
Deutschman Corp., Tobe, Providence Highway, Norwood, Mass.—HF
DeVry Corp., 1111 Armitage Ave., Chicago, Ill.—HP
DuMont Labs. Inc., Allen B., 1000 Main Ave., Clifton, N. J.—HN, HM, HP, HR, HD, HA, HC, HB, HE, HF, HJ, HS, HL
Electronic Transformer Co., 207 W. 25th St., New York 1, N. Y.—HE, HF
Electronics Contracting Co., 122 Chambers St., New York 7, N. Y.—HR, HD
Erco Radio Laboratories Inc., Stewart Ave., E., Garden City, L. I., N. Y.—HL, HN, HR, HA
Fairchild Recording Equipment Corp., 154 St. & 7 Ave., Whitestone, N. Y.—HN, HM, HP, HD, HA, HC, HB, HE, HF
Falstrom Co., Falstrom Court, Passaic, N. J.—HC
Federal Telephone & Radio Corp., 100 Kingsland Rd., Clifton, N. J.—HL, HN, HM, HA, HC, HS
Fidelity Amplifier Co., 703 Willow St., Chicago 14, Ill.—HA
Fisher Radio Corp., 39 E. 47 St., New York, N. Y.—HH
Freed Transformer Co., 1718 Weirfield St., Brooklyn 27, N. Y.—HF
Gale Dorothea Mechanisms, 37-61 85 St., Jackson Heights, L. I., N. Y.—HL, HN, HM, HP, HR, HD, HA
Gates Radio Co., Quincy, Ill.—HL, HN, HM, HP, HR, HD, HA, HC, HB, HF, HJ, HS, HE
General Electric Co., Electronics Dept., Syracuse, N. Y.—HL, HN, HM, HP, HR, HD, HA, HC, HE, HF, HS, HJ, HL, HG
General Radio Co., 275 Mass Ave., Cambridge 39, Mass.—HF
Geraton Products, 2115 N. Charles St., Baltimore 18, Md.—HP, HD
Gertsch Products, Inc., 11846 Mississippi Ave., Los Angeles 25, Calif.—HF
Gray Research & Development Co., 16 Arbor St., Hartford 1, Conn.—HE, HB
Greene Mfg. Co., L. Charlton, 314 Washington St., Newton Corner 58, Mass.—HD, HP
Grem Engineering Co., 206 8th Ave., Brooklyn 15, N. Y.—HP
Hallen, 3503 W. Olive Ave., Burbank, Calif.—HB, HE
Hamilton Electronics, 2726 Pratt Ave., Chicago 45, Ill.—HL, HN, HM, HP, HR, HD, HA, HC, HB, HE, HF, HJ, HS
Hart & Co., Frederick, 837 Main St., Poughkeepsie N. Y.—HL, HD, HA
Highland Engineering Co, 32 Holman Blvd., Hicksville, L. I., N. Y.—HL, HN, HM, HP, HR, HD, HA, HE, HF
Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—HL, HN, HM, HP, HR, HD, HA, HC, HB, HE, HF, HJ, HS
Industrial Electronics, 2457 Woodward Ave., Detroit 1, Mich.—HF
International Projector Corp., 55 LaFrance Ave., Bloomfield, N. J.—HP
Intervox Corp., 2701 California Ave., Seattle 6, Wash.—HN
Jackson Industries, Inc., 58 E. Cullerton St., Chicago 16, Ill.—HP
Kellogg Switchboard & Supply Co., 6650 S. Cicero Ave., Chicago 38, Ill.—HS, HE, HF
Keystone Electronics Co., 50 Franklin St., New York 13, N. Y.—HJ
Langevin Mfg. Corp., 37 W. 65th St., New York 23, N. Y.—HL, HN, HM, HP, HA, HV
Link Radio Corp., 125 W. 17 St., New York 11, N. Y.—HN, HM, HC
Loge, J. M., 2171 W. Washington Blvd., Los Angeles 7, Calif.—HL, HN, HM, HP, HR, HD
Lumenite Electronic Co., 407 S. Dearborn St., Chicago 5, Ill.—HS
McIntosh Laboratory, Inc., 910 King St., Silver Spring, Md.—HN, HM, HP, HR, HD, HA, HC, HE
Magna Electronics Co., 3707 W. Jefferson Blvd., Los Angeles 16, Calif.—HN, HM, HP, HR, HD, HA, HC, HJ, HS
Magnetic Recorders Co., 7120 Melrose Ave., Los Angeles 46, Calif.—HL, HN, HM, HR, HD, HA, HC, HE, HS
Maurer, Inc., J. A., 37-01 31st St., Long Island City 1, N. Y.—HD
Miles Reproducer Co., 812 Broadway, New York 3, N. Y.—HM, HD, HL, HN, HP, HR, HA
Minnesota Electronics Corp., 97 E. 5th St., St. Paul 1, Minn.—HN, HM, HP, HR, HD, HA, HE, HF
Modulaton Products Co., 92 East End Ave., New York, N. Y.—HD, HA
MP Concert Installations, Fairfield 10, Conn.—HP
Motiograph, Inc., 4431 W. Lake St., Chicago, Ill.—HP
National Electronics Laboratories, 1713 Kalorama Rd., N. W., Washington 9, D. C.—HJ, HS
Neptune Electronics Co., 433 Broadway, New York 13, N. Y.—HL, HN, HM, HP, HR, HA, HJ, HS
Newcomb Audio Products Co., 6824 Lexington Ave, Hollywood 38, Calif.—HD, HF
Orthon Corp., 196 Albion Ave., Paterson 2, N. J—HN, HA, HE, HF
Pentron Corp., 611 W. Division St., Chicago 10, Ill.—HL, HN, HM, HP, HR, HD, HA
Pickering & Co., Oceanside, L. I., N. Y.—HA, HE, HF
Precision Electronics, 641 Milwaukee Ave., Chicago 22, Ill.—HN, HM, HP, HR, HD
Press Wireless Mfg. Co., Cantiague Rd., Hicksville, L. I., N. Y.—HL, HN, HM, HP, HD, HA, HF, HJ, HS, HC, HB
Presto Recording Corp., P. O. Box 500, Hackensack, N. J.—HE, HF, HL, HN, HM, HP, HR, HD, HS, HJ, HA, HC, HB
Racon Electric Co., 52 E. 19th St., New York, N. Y.—HE
Radio Corp. of America, RCA-Victor Div., Camden, N. J.—HL, HN, HM, HP, HR, HD, HA, HC, HB, HE, HF, HJ, HS
Radiomarine Corp. of America, 75 Varick St., New York 13, N. Y.—HL, HN, HM, HP, HR, HD, HA, HJ, HS
Radio-Music Corp., 84 S. Water St., Port Chester, N. Y.—HL, HN, HM, HP, HR, HD, HA, HC, HB, HE, HF
Rauland-Borg Corp., 3523 W. Addison St., Chicago 18, Ill.—HP
Raytheon Mfg. Co., 138 River St., Waltham 54, Mass.—HL, HN, HM, HP, HR, HD, HA, HC, HB
Reeves-Hoffman Corp., 321 Cherry St., Carlisle, Pa.—HL, HN, HM, HP, HR, HA, HC, HB
Rek-O-Kut Co., 38-01 Queens Blvd., Long Island City 1, N. Y.—HD
Sargent-Rayment Co., 212 Ninth St., Oakland 7, Calif.—HN, HD
Scott, Inc., Herman Hosmer, 385 Purnam Ave., Cambridge 39, Mass.—HA, HH
Sierra Electronic Corp., PO. Box 346, San Carlos, Calif.—HL, HN, HP, HA
Simplophone Corp. of America, 303 Fifth Ave., New York 16, N. Y.—HN
Simpson Mfg. Co., Mark, 32-28 49 St., Long Island City 3, N. Y.—HL, HN, HM, HP, HR, HD, HA
Somerset Laboratories, 1701 Palisade Ave., Union City, N. J.—HP
Sonar Radio Corp., 59 Myrtle Ave., Brooklyn 1, N. Y.—HN, HM, HP, HR, HD, HA
Sound Apparatus Co., Stirling, N. J.—HA
Sound, Inc., 221 E. Cullerton St., Chicago 16, Ill.—HI
Sound Projects Co., 2810 W. Harrison St., Chicago 12, Ill.—HD
Special Products Co., 9115 Brookville Rd., Silver Spring, Md.—HD, HA
Spencer-Kennedy Laboratories, 186 Mass. Ave., Cambridge 39, Mass.—HE, HF
Stancil-Hoffman Corp., 1016 N. Highland Ave., Hollywood 38, Calif.—HL, HN, HM, HP, HR, HD, HA, HC, HB, HE, HF
Standard Electronics Corp., 25 W. 43 St., New York 18, N. Y.—HL, HN, HM, HP, HR, HC
Standard Transformer Corp, Elston, Kedzie & Addison Sts., Chicago 18, Ill.—HF
Sterling Electronic Labs., 151 E. 70th St., New York 21, N. Y.—HL, HN, HM, HP, HR, HD, HA
Stromberg-Carlson Co., 100 Carlson Rd., Rochester 3, N. Y.—HM, HR, HA
Tech Laboratories, Inc., Bergen & Edsall Blvds., Palisades Park, N. J.—HS
Telectro Industries Corp, 35-16 37th St., Long Island City 1, N. Y.—HL, HN, HM, HP, HR, HD, HA, HE, HF, HJ, HS
Thordarson Electric Mfg. Div., Maguire Industries Inc., 500 W. Huron St., Chicago 10, Ill.—HL, HN, HM, HP, HR, HD, HA, HE, HF
Transmitter Equip. Mfg. Co., 345 Hudson St., New York 14, N. Y.—HL, HN, HM, HP, HR, HD, HA, HC
U. S. Recording Co., 1121 Vermont Ave. N. W., Washington 5, D. C.—HL, HN, HM, HP, HR, HD, HA, HC, HB, HE, HF, HJ, HS
United Transformer Corp., 150 Varick St., New York 13, N. Y.—HE, HF
Universal Broadcast Equipment Co., 6035 Northwest Highway, Chicago 31, Ill.—HD, HP
University Loudspeakers Inc., 80 S. Kensico Ave., White Plains, N. Y.—HE
Univox Corp., 83 Murray Sts., New York 7, N. Y.—HL, HN, HM, HP, HR, HD, HA, HC, HE, HF, HS
Webster Electric Co., Clark & DeKoven Aves., Racine, Wisc.—HD, HA
Western Sound & Electric Labs., 805 S. 5th St., Milwaukee, Wisc.—HN, HM, HP, HR, HD, HA, HC, HB, HS
Winslow Co., 9 Liberty St., Newark 5, N. J.—HJ, HS

REPRODUCING & RECORDING EQUIPMENT

16—Disc

Recording amplifiers ..... JA
Pickup arms ..... JP
Turntable bases ..... JF
Record changers ..... JZ
Record mfg. equipment ..... JB
Synchronized equipment ..... JO
Recording heads ..... JH
Reproducing heads ..... JR
Lathes ..... JL
Cutting mechanisms ..... JU
Microscopes ..... JM
Motors ..... JJ
Transcription players ..... JT
Complete recorders, portable ..... JC
Complete recorders, studio ..... JS
Recording turntables ..... JD
Multispeed turntables ..... JE

Allied Radio Corp., 833 W. Jackson Blvd., Chicago 7, Ill.—JC
Allied Recording Products Co., 21-09 43rd Ave., Long Island City 1, N. Y.—JL, JU, JD, JT
Altec Lansing Corp., 1161 N. Vine St., Hollywood 38, Calif.—JP, JR

Station Census

AM stations 2150
TV stations 106
FM stations 710

TV cities served number 63. Sets in use approximately 6,500,000.

All the top engineering and management personnel in these stations is reached by, and read, TELE-TECH. Edited *by* engineers, *for* engineers, TELE-TECH brings clearly written, compact, and authoritative articles dealing with the latest developments in the broadcasting-radio engineering field.

American Microphone Co., 370 S. Fair Oaks Ave., Pasadena 1, Calif.—JP, JH
Arc Radio Corp., 523 Myrtle Ave., Brooklyn 5, N. Y.—JP
Astatic Corp., Harbor & Jackson Sts., Conneaut, Ohio—JP, JH, JR
Audak Co., 500 Fifth Ave., New York, N. Y.—JH, JP, JR
Audio Industries, Michigan City, Ind.—JC
Audio-Master Co., 23 W. 45 St., New York 19, N. Y.—JT
Baldor Electric Co., 4351 Duncan Ave., St. Louis, Mo.—JJ
Barber & Howard, Westerly, R. I.—JR
Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N. Y.—JM
Beam Radionics Corp., 224 N. Desplaines St., Chicago 6, Ill.—JE
Bell Sound Systems, 555 Marion Rd., Columbus 7, Ohio—JC, JT
Berger Communications, 109-01 72 Rd., Forest Hills, L. I., N. Y.—JC, JS
Bodine Electric Co., 2254 W. Ohio St., Chicago 12, Ill.—JJ
Brush Development Co., 3405 Perkins Ave., Cleveland 14, Ohio—JH, JR
Buhl Optical Co., 1009 Beech Ave., Pittsburgh 12, Pa.—JM
Califone Corp., 1041 N. Sycamore Ave., Hollywood 38, Calif.—JT
Caltron Products, 1406 S. Hobart Blvd., Los Angeles 6, Calif.—JP, JH, JR
Cinaudagraph Speakers, Inc., 1401 Fairfax Trafficway, Kansas City, Kans.—JT
Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—JL, JA
Clarkstan Corp., 11921 W. Pico Blvd., Los Angeles 64, Calif.—JP, JR, JM
Cyclohm Motor Corp., Div. Howard Industries, Racine, Wisc.—JJ
DuMont Laboratories, Allen B., 1000 Main St., Clifton, N. J.—JP, JH, JR, JL, JM, JS, JU, JA
Duotone Co., Locust St., Keyport, N. J.—JH
Eastern Air Devices, Inc., 585 Dean St., Brooklyn 17, N. Y.—JJ
Electric Specialty Co., 211 South St., Stamford, Conn.—JJ
Electronics Contracting Co., 122 Chambers St., New York 7, N. Y.—JC, JA
Electro-Voice Inc., Buchanan, Mich.—JR
Fairchild Recording Equipment Corp., 154 St. & 7th Ave., Whitestone, N. Y.—JP, JH, JR, JL, JM, JC, JS, JU, JA
Gale Dorothea Mechanisms, 37-61 85th St., Jackson Heights, L. I., N. Y.—JA
Garrard Sales Corp., 164 Duane St., New York 13, N. Y.—JZ
Gates Radio Co., Quincy, Ill.—JP, JH, JR, JL, JM, JC, JS, JU, JA
General Electric Co., Electronics Dept., Syracuse, N. Y.—JP, JR
General Industries Co., Olive & Taylor Sts., Elyria, Ohio—JJ, JD, JE, JC, JU
General Instrument Co., 829 Newark Ave., Elizabeth, N. J.—JZ, JE
Gray Research & Development Co., 15 Arbor St., Hartford 1, Conn.—JP, JR
Grem Engineering Co., 206 8th Ave., Brooklyn 15, N. Y.—JC, JS, JA
Guernet Electrical Machinery Inc., Box 196, Meriden, Conn.—JJ
Hamilton Electronics, 2726 Pratt Ave., Chicago 45, Ill.—JA
Highland Engineering Co., 32 Holman Blvd., Hicksville, L. I., N. Y.—JA
Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—JP, JA
Libra Film Distributors, 6525 Sunset Blvd., Hollywood 28, Calif.—JM, JC, JS, JA
Lincoln Engineering Co., 5701 Natural Bridge Ave., St. Louis 20, Mo.—JZ
Livingston Electronic Corp., Livingston, N. J.—JP
McClure Talking Pictures, O. J., 1115 W. Washington Blvd., Chicago 7, Ill.—JT
Magna Electronics Co., 3707 W. Jefferson Blvd., Los Angeles 16, Calif.—JA
Magnetic Motors Corp., Fox Island Rd., Portchester, N. Y.—JJ, JT
Magnetic Recorder Co., 7120 Melrose Ave., Los Angeles 46, Calif.—JP, JH, JR, JL, JC, JS, JU, JA
Mannon Sound Stages Inc., 112 W. 89th St., New York 24, N. Y.—JM, JA
Marble Card Electric Co., Gladstone 1, Mich.—JJ
Maurer, Inc., J. A., 37-01 31st St., Long Island City 1, N. Y.—JA
Micro Engineering Corp., 15 E. Tujunga Ave., Burbank, Calif.—JM, JC, JS
Miles Reproducer Co., 812 Broadway, New York 3, N. Y.—JH, JR, JA
Milwaukee Stamping Co., 800 S. 72 St., Milwaukee, Wisc.—JZ
Minnesota Electronics Corp., 97 E. 5th St., St. Paul 1, Minn.—JA
Newcomb Audio Products Co., 6824 Lexington Ave., Hollywood 38, Calif.—JT
Oak Mfg. Co., 1260 Clybourn Ave., Chicago, Ill.—JZ
Onan & Sons, D. W., Minneapolis, Minn.—JS
Pentron Corp., 611 W. Division St., Chicago 10, Ill.—JA
Pickering & Co., Oceanside, N. Y.—JP, JR
Poinsettia, Inc., 112 Cedar Ave., Pitman, N. J.—JA, JL, JM, JC, JS, JU, JH, JB
Precision Electronics Inc., 641 Milwaukee Ave., Chicago 22, Ill.—JA

Gray RESEARCH

FEATURES IDEAL REPRODUCTION

TRANSCRIPTION ARMS

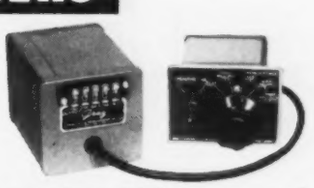
NEW VISCOUS-DAMPED 108-B ARM

For all records — 33⅓, 45 and 78 r.p.m. Radically new suspension development on the viscous damping principle for perfect tracking of records and elimination of tone arm resonances. Instant cartridge change with automatic correct stylus pressure. Solves all transcription problems. Ideal for LP records. For Pickering, new GE (short), old GE (long) cartridges. Write for bulletin. Price, less cartridges, $50.70

MODEL 106-SP ARM

Designed to meet strictest requirements of modern highly compliant pick-up cartridges. 3 cartridge slides furnished enable GE 1-mil, 2½-mil or 3-mil cartridges or Pickering cartridge to be slipped into position in a jiffy. No tools or solder! Superb reproduction of 33⅓, 45 or 78 r.p.m. records. Low vertical inertia, precisely adjustable stylus pressure. Write for bulletin. Price, less cartridges, $45.15

EQUALIZERS



MODEL 603 EQUALIZER

Latest of the universally adopted Gray Equalizers used, with Gray Tone Arms, as standard professional equipment by broadcast stations. High-frequency characteristics obtainable comprise 5 steps — flat, high roll-off, NAB, good records, poor records. For both GE and Pickering cartridges. Price, $50.70

MODEL 602 EQUALIZER

Has 4 control positions, highly accurate response curves. Price, $49.50

Write for bulletins on Gray Equalizers.

GRAY RESEARCH and Development Co., Inc.
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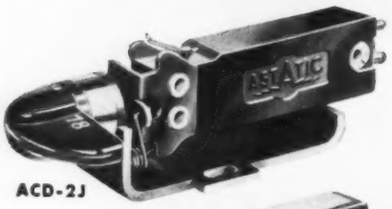
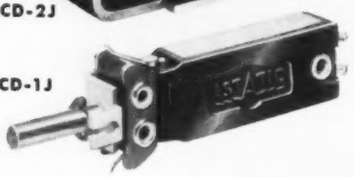
Division of The GRAY MANUFACTURING COMPANY
Originators of the Gray Telephone Pay Station and the Gray Audograph

ASTATIC'S NEWEST HEADLINERS IN PICKUP CARTRIDGES and MICROPHONES

"AC" SERIES CARTRIDGES



ACD-2J



ACD-1J

EVEN IN A DAY of comparatively small units, the perfection of sound reproduction from these miniature Astatic Cartridges is a surprising experience. Astatic engineers have accomplished a mechanical drive system with a new low in inertia, and which provides "AC" Cartridges with exceptionally smooth response. This same feature also helps achieve new tracking excellence, low needle talk, assures long life of both needle and record. The overall excellence of frequency response is particularly superior in the high frequencies. "AC" Series Cartridges have housings of molded Bakelite, metal mounting brackets (fit standard 1/2" mounting centers) and needle guards. They use Astatic's Type "A" Needle, designed with the same successful holding principle as the famous Astatic Type "Q" Needle and easily changeable without tools. Nothing has been omitted which would give the "AC" Series higher performance values.

SPECIFICATIONS

Model	List Price	Minimum Needle Pressure	Output Voltage 1000 c.p.s. 0.5 Meg Load	Frequency range c.p.s.	Needle Type	Application
AC-78-J	$ 8.90	6 gr.	1.0*	50-10,000	A-3 (3-mil sapphire tip)	Standard 78 RPM Records
AC-J	8.90	5 gr.	1.0**	50-10,000	A-1 (1-mil sapphire tip)	33-1/3 and 45 RPM Records
AC-AG-J	8.90	6 gr.	1.0**	50-10,000	A-AG† (Sapphire tip)	33-1/3, 45 and 78 RPM Records
DOUBLE NEEDLE TURNOVER MODELS:				1-mil tip needle for LP 33-1/3 and 45 RPM records. 3-mil tip needle for standard 78 RPM records.		
ACD-J	9.50	6 gr. either needle	1.0**	50-6,000	A-1 and A-3 (sapphire tips)	For Record Changers Using Turnover Cartridge
ACD-1J	9.50	(Same as ACD-J except equipped with spindle for turnover knob)				
ACD-2J	10.00	(Same as ACD-J except equipped with turnover bracket and knob)				

†"ALL-GROOVE" Needle tip of special design and size to play either 33-1/3 and 45 RPM (narrow groove) or 78 RPM (standard groove) records.

*Audiotone 78-1 Test Record
**RCA 12-5-31V Test Record

"SYNABAR" UNIDIRECTIONAL CARDIOID CRYSTAL MICROPHONE

NEWLY perfected unit employing special sintered metal which cancels out 15 db front to back, making it, for practical purposes, dead to sound from rear. Has truly excellent frequency range for its type and price class, 50 to 10,000 c.p.s., PLUS a Response Selector switch to provide choice of ideal pick-up characteristics for either crisp voice or general voice and music. Crystal elemer has special METALSEAL protection against moisture or dryness. Output level is —54 db, high impedance. Satin chrome finish, 20' single conductor shielded cable, with or without off-on switch. Recommended, without reservation, for highest quality reproduction and elimination of extraneous noise, in the widest variety of modern applications.

	List Price
DR-10—Code ASVFL . . .	**$37.25**
DR-10-S*—Code ASVFK .	**39.95**

*** With off-on switch**

Astatic Crystal Devices manufactured under Brush Development Co. patents

THE Astatic CORPORATION
ASTATIC
CONNEAUT, OHIO
IN CANADA: CANADIAN ASTATIC LTD., TORONTO, ONTARIO

Presto Recording Corp., P. O. Box 500, Hackensack, N. J.—JH, JC, JS, JU, JA, JO, JD, JT, JF, JR
Proctor Soundex Corp., 133 N. Sixth Ave., Mount Vernon, N. Y.—JT
QRK Electronic Products, 445 N. Circle Dr., Fresno 4, Calif.—JJ, JD, JE
Radio Corp. of America, RCA-Victor Div., Camden, N. J. —JP, JH, JR, JL, JM, JC, JS, JU, JA
Radio-Music Corp., 84 S. Water St., Port Chester, N. Y.—JP, JR, JA
Raytheon Mfg. Co., 138 River St., Waltham, Mass.—JA
Redmond Co., Owosso, Mich.—JJ
Rek-O-Kut Co., 38-01 Queens Blvd., Long Island City 1, N. Y.—JD, JL, JC, JS, JU, JA, JT, JE
Robbins & Meyers, Inc., Logonda Ave., Springfield, Ohio —JJ
Robinson Recording Labs., 35 S. 9th St., Philadelphia 7, Pa—JP, JL, JS, JU, JT
Scott, Inc, Hermon Hosmer, 385 Purnam Ave., Cambridge, Mass.—JA
Scully Machine Co., 62 Walter St., Bridgeport 8, Conn. —JL, JU, JS, JC, JD
Simpson Mfg. Co., Mark, 32-28 49 St., Long Island City 3, N. Y.—JC, JA
Sonotone Corp., Elmsford, N. Y.—JR, JP
Sound, Inc., 221 E. Cullerton St., Chicago 16, Ill.— JH, JR
Sound Projects Co., 2810 W. Harrison St., Chicago 12, Ill.—JR
Soundscriber Corp., 146 Munson St., New Haven 4, Conn.—JC, JS
Speak-O-Phone Recording Equip. Co., 23 W. 60th St., New York 23, N. Y.—JH, JR, JC, JU, JA
Stancil-Hoffman Corp., 1016 N. Highland Ave., Hollywood 38, Calif.—JA
Sterling Electric Motors, 5401 Anaheim-Telegraph Rd., Los Angeles 22, Calif.—JJ
Sterling Electronic Labs., 151 E. 70th St., New York 21, N. Y.—JP, JF
Telectro Industries Corp., 35-16 37th St., Long Island City 1, N. Y.—JA
Tetrad Corp., 60 N. Broadway, Yonkers 2, N. Y.—JP
Thordarson Electric Mfg. Div., Maguire Industries, Inc., 500 W. Huron St., Chicago 10, Ill.—JA
U. S. Motor Co., 200 E. Slauson Ave., Los Angeles 11, Calif.—JJ
U. S. Recording Co, 1121 Vermont Ave., N. W., Washington 5, D. C.—JP, JH, JR, JL, JM, JC, JS, JU, JA
Universal Broadcast Equipment Co., 6035 Northwest Highway, Chicago 31, Ill—JR
Van Eps Laboratories, Fred, R. D. 2, Plainfield, N. J.— —JH, JL, JM, JS, JU
V-M Corp., 280 Park St., Benton Harbor, Mich.—JZ, JE
Webster Electric Co., Clark & DeKoven Aves., Racine, Wisc.—JP, JH, JR
Western Sound & Electric Labs., 805 S. 5th St., Milwaukee, Wisc.—JA
Westrex Corp., 111 8th Ave., New York 11, N. Y.— JP, JH, JR, JL, JM, JC, JS, JU, JA
Wilcox Gay Corp., Charlotte, Mich.—JC
W-N Recorder Corp., 130 W. 46 St., New York 19, N. Y.—JC

17—Tape

Recording amplifiers ..... **IA**
Recording heads ..... **IB**
Special equipment ..... **IE**
Synchronized equipment ..... **IJ**
Tape indexer ..... **ID**
Mechanisms ..... **IF**
Power supplies ..... **IR**
Recorders, miniature portable ..... **IC**
Recorders, portable ..... **IP**
Recorders, studio ..... **IS**

Accurate Engineering Co., 2005 Blue Island Ave., Chicago 8, Ill.—IR
American Electroneering Co., 2112 S. La Brea, Los Angeles 16, Calif.—IA
American Film Registry, 28 E. Jackson Blvd., Chicago 4, Ill.—IP
American Television & Radio Co., 300 E. 4th St., St. Paul 1, Minn.—IR
Ampex Electric Corp., 1414 El Camino Real, San Carlos Calif.—IP, IS, IA, IE
Amplifier Corp. of America, 398 Broadway, New York 13, N. Y.—IB, IP, IS, IA, IR, IF, ID, IE
Ampro Corp., 2835 N. Western Ave., Chicago 18, Ill. —IP
Arc Radio Corp., 523 Myrtle Ave., Brooklyn 5, N. Y. —IP, IA
Arlington Electric Products, Inc., 500 W. 52nd St., New York 19, N. Y.—IP, IS, IA
Audiograph Co., 1414 El Camino Real, San Carlos, Calif.—IP, IS, IA
Audio-Master Co., 23 W. 45 St., New York 19, N. Y. —IP, IB
Audio & Video Products Corp., 1650 Broadway, New York, N. Y.—IS
Bell Sound Systems, 555 Marion Rd., Columbus 7, Ohio —IP
Berlant Associates, 4917 W. Jefferson Blvd., Los Angeles 16, Calif.—IP, IS
Brush Development Co., 3405 Perkins Ave., Cleveland 14, Ohio—IP, IS, IA, IB, IF, IE

Califone Corp., 1041 N. Sycamore Ave., Hollywood 38, Calif.—IP, IS
Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—IP, IS, IA
Cinetech Co., 106 West End Ave., New York 23, N. Y. —IP, IS, IA, IR
Cook Electric Co., 2700 Southport Ave., Chicago 14, Ill. —IP, IS
Crestwood Recorder Corp., 624 W. Adams St., Chicago 6, Ill.—IP
Crosby Enterprises, Bing, 9028 Sunset Blvd., Los Angeles 46, Calif.—IP, IS
Dictaphone Corp., 420 Lexington Ave., New York 17, N. Y.—IP, IE
Eicor, Inc., 1501 W. Congress St., Chicago 7, Ill.—IP
Fairchild Recording Equipment Corp., 154 St. & 7th Ave., Whitestone, N. Y.—IS, IA, IJ
Feiler Engineering Co., 945 W. George St., Chicago 14, Ill.—IP, IA
Gates Radio Co., Quincy, Ill.—IP, IS, IA
General Industries Co., Olive & Taylor St., Elyria, Ohio —IP
Grem Engineering Co., 206 8th Ave., Brooklyn 15, N. Y. —IP, IS
Hallen, 3503 W. Olive Ave., Burbank, Calif.—IP, IS
Hamilton Electronics, 2726 Pratt Ave., Chicago 45, Ill.—IA
Hart & Co., Frederick, 837 Main St., Poughkeepsie, N. Y.—IP
Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—IP, IS, IA, IR
Industrial Cinema Service, 221 N. La Salle St., Chicago 1, Ill.—IP, IS, IA
International Movie Producers' Service, 515 Madison Ave., New York 22, N. Y.—IP
Lekas Mfg. Co., 111 S. 4th Ave., Ann Arbor, Mich.—IP, IS
Libra Film Distributors, 6525 Sunset Blvd., Hollywood 28, Calif.—IP, IS, IA, IR
Magnecord, Inc., 360 N. Michigan Ave., Chicago 1, Ill. —IP, IS, IA, IB (See ad P. 62)
Magnetic Recorders Co., 7120 Melrose Ave., Los Angeles 46, Calif.—IP, IS, IA, IR
Mallory & Co., Inc., P. R., 3029 E. Washington St., Indianapolis 1, Ind.—IR
Mannon Sound Stages Inc., 112 W. 89th St., New York 24, N. Y.—IS
Maurer, Inc., J. A., 37-01 31st St., Long Island City 1, N. Y.—IP, IS
Michigan Film Library, 15745 Rosemount, Detroit 23, Mich.—IP
Micro Engineering Corp., 15 E. Tujunga Ave., Burbank, Calif.—IP, IS, IA, IR
Miles Reproducer Co., 812 Broadway, New York 3, N. Y.—IP, IA, IC, IE
Minnesota Electronics Corp., 97 E. 5th St., St. Paul 1, Minn.—IA
National Recorders Inc., 629 N. LaBrea Ave., Los Angeles 46, Calif.—IP, IS
Operadio Mfg. Co., St. Charles, Ill.—IP
Pentron Corp., 611 W. Division St., Chicago 10, Ill.—IS, IA, IP
Perm-O-Flux Corp., 4900 W. Grand Ave., Chicago 39, Ill.—IP
Press Wireless Mfg. Co., Cantiague Rd., Hicksville, L. I., N. Y.—IP, IA
Presto Recording Corp., P. O. Box 500, Hackensack, N. J.—IB, IE, IP, IS, IA
Process & Instruments, 60 Greenpoint Ave., Brooklyn 22, N. Y.—IP
Radio Corp. of America, RCA-Victor Div., Camden, N. J.—IP, IS, IA, IR, IE
Radiomarine Corp. of America, 75 Varick St., New York 13, N. Y.—IP, IA
Rangertone Inc., 73 Winthrop St., Newark 4, N. J.—IP, IS, IJ, IB (See ad P. 62)
Raytheon Mfg. Co., 138 River St., Waltham, Mass.—IA
Recogram Recorders Co., 11338 Burbank Blvd., N. Hollywood, Calif.—IP, IS, IA, IE
Reeves Soundcraft Corp., 35-54 36 St., Long Island City 6, N. Y.—IR
Revere Camera Co, 320 E. 21 St., Chicago 16, Ill.—IP
Simpson Mfg. Co., Mark, 32-28 49 St., Long Island City 3, N. Y.—IP, IA
Sonar Radio Corp., 59 Myrtle Ave., Brooklyn 1, N. Y.—IP, IA, IR
Sound, Inc., 221 E. Cullerton St., Chicago 16, Ill.—IP, IA
Special Products Co., 9115 Brookville Rd., Silver Spring, Md —IA
Stancil-Hoffman Corp., 1016 N. Highland Ave., Hollywood 38, Calif.—IP, IS, IA, IR
Synchrotone Film Sound, Inc., 1776 Broadway, New York 19, N. Y.—IP
Tape Recording Apparatus Co., Box 221, Caldwell, N. J. —IB, IE
Tapetone Mfg. Corp., 202 Tillery St., Brooklyn, N. Y. —IP
U. S. Recording Co., 1121 Vermont Ave., N. W., Washington 5, D. C.—IP, IS, IA, IR
Universal Moulded Products Corp., Bristol, Va.—IP
Webster-Chicago Corp, 5610 W. Bloomingdale Ave., Chicago 39, Ill.—IP, IS
Webster Electric Co., Clark & DeKoven Aves., Racine, Wisc.—IP, IS, IA
Wilcox-Gay Corp., Charlotte, Mich.—IP

18—Wire

Recorders—portable ..... **KP**
Recorders, miniature portable ..... **KA**
Recorders—studio ..... **KS**
Synchronized equipment ..... **KI**

Air King Products Co., 170 53 St., Brooklyn 32, N. Y. —KP, KS
Aurex Corp., 1115 N. Franklin St., Chicago, Ill.—KP
Brush Development Co., 3405 Perkins Ave., Cleveland 14, Ohio—KP, KS
Crescent Industries, Inc., 4140 W. Belmont Ave., Chicago 41, Ill.—KP
Gates Radio Co., Quincy, Ill.—KP, KS
Geraton Products, 2115 N. Charles St., Baltimore 18, Md.—KP
Hart & Co., Frederick, 837 Main St., Poughkeepsie, N. Y.—KP
Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—KP, KS
Industrial Cinema Service, 221 N. La Salle St., Chicago 1, Ill.—KP, KS
Lear, Inc., 110 Ionia Ave. N. W., Grand Rapids 2, Mich.—KP, KS
Libra Film Distributors, 6525 Sunset Blvd., Hollywood 28, Calif.—KP, KS
Magnetic Corp. of America, 756 N. Milwaukee Ave., Chicago 22, Ill.—KP
Magnetic Recorders Co., 7120 Melrose Ave., Los Angeles 46, Calif.—KP, KS
Mannon Sound Stages Inc., 112 W. 89th St., New York 24, N. Y.—KS
Mohawk Business Machines Corp., 743 Fifth Ave., New York 22, N. Y.—KS
Molded Insulation Co., 335 E. Price St., Philadelphia, Pa.—KS
Peirce Wire Recorder Corp., 1328 Sherman Ave., Evanston, Ill.—KP
Pentron Corp., 611 W. Division St., Chicago 10, Ill.—KP, KS
Process & Instruments, 60 Greenpoint Ave., Brooklyn 22, N. Y.—KP
Radiomarine Corp. of America, 75 Varick St., New York 13, N. Y.—KP
Webster-Chicago Corp., 5610 W. Bloomingdale Ave., Chicago 39, Ill.—KP, KS
Webster Engineering Co., 91 Second Ave., S. E., Cedar Rapids 39, Ia.—KP
Wireway Corp. of America, 1331 Halsey St., Brooklyn 27, N. Y.—KP

19—Film

Photographic Records

16 m/m Recorders, studio ..... **OS**
16 m/m Recorder, portable ..... **OP**
35 m/m Recorders, studio ..... **OT**
35 m/m Recorders, portable ..... **OR**
Recording amplifiers ..... **OA**

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16 m/m portable ..... **OF**
35 m/m studio ..... **OB**
35 m/m portable ..... **OO**
17.5 m/m studio ..... **OW**
17.5 m/m portable ..... **OZ**
Miniature recorders ..... **OC**
Synchronized equip. ..... **OJ**

Amplifier Corp. of America, 398 Broadway, New York 13, N. Y.—OA
Arlington Electric Products, Inc., 500 W. 52nd St., New York 19, N. Y.—OS, OP, OT, OR, OA
Berndt-Bach, Inc., 7377 Beverly Blvd., Los Angeles 36, Calif.—OS, OP, OA
Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—OA, OB, OO
Cinetech Co., 106 West End Ave., New York 23, N. Y. —OS, OP, OT, OR, OA
Colonial Films, 2118 Mass Ave., N. W. Washington 8, D. C.—OS, OP
Feiler Engineering Co., 945 W. George St., Chicago 14, Ill.—OP, OA
Gale Dorothea Mechanisms, 37-61 85th St., Jackson Heights, L. I., N. Y.—OA
Hallen, 3503 W. Olive St., Burbank, Calif.—OS, OP, OT, OR, OM, OZ
Hart & Co., Frederick, 837 Main St., Poughkeepsie, N. Y.—OT, OR, OA
Industrial Cinema Service, 221 N. La Salle St., Chicago 1, Ill.—OS, OP
Libra Film Distributors, 6525 Sunset Blvd., Hollywood 28, Calif.—OS, OP, OA, OT, OR
Magnetic Recorders Co., 7120 Melrose Ave., Los Angeles 46, Calif.—OA
Mannon Sound Stages, Inc., 112 W. 89th St., New York 24, N. Y.—OS, OP
Maurer, Inc., J. A., 37-01 31st St., Long Island City 1, N. Y.—OS, OP, OA, OJ
Micro Engineering Corp., 15 E. Tujunga Ave., Burbank, Calif.—OS, OP, OT, OR, OA
Miles Reproducer Co., 812 Broadway, New York 3, N. Y. —OP, OA, OR, OC
Minnesota Electronics Corp., 97 E. 5th St., St. Paul 1, Minn.—OA
Move-Mite Corp., 1105 Truman Rd., Kansas City 6, Mo.—OF
Pentron Corp., 611 W. Division St., Chicago 10, Ill.—OA
Precision Film Laboratories, 21 W. 46th St., New York 19, N. Y.—OS, OP
Prestoseal Mfg. Corp., 38-41 Queens Blvd., Long Island City 1, N. Y.—OM, OF, OB, OO
Radio Corp. of America, RCA-Victor Div., Camden, N. J. —OS, OP, OT, OR, OA
Raytheon Mfg. Co., Waltham, Mass.—OA
Stancil-Hoffman Corp., 1016 N. Highland Ave., Hollywood 38, Calif.—OS, OP, OT, OR, OA
Synchrotone Film Sound, Inc., 1776 Broadway, New York 19, N. Y.—OW, OZ, OB, OO
Telectro Industries Corp., 35-16 37th St., Long Island City 1, N. Y.—OA
Thordarson Electric Mfg. Div., Maguire Industries, Inc., 500 W. Huron St., Chicago 10, Ill.—OA
Westrex Corp., 111 8th Ave., New York 11, N. Y.—OS, OP, OT, OR, OA, OF, OO, OM, OB

20—Graphic

Recorders, portable ..... **NP**
Recorders, fixed ..... **NF**
Drives, spring ..... **ND**
Drives, electric ..... **NE**
Drives, flexible cable ..... **NA**

Air Associates, Inc., Teterboro, N. J.—NP, NF, ND, NE
Airborne Instruments Laboratory, 160 Old Country Road, Mineola, N. Y.—NP, NF
Audio-Tone Oscillator Co., 237 John St., Bridgeport 3, Conn.—NP, NF
Boehme Inc., H. O., 915 Broadway, New York 10, N. Y. —NP, NF, NE, NA
Brush Development Co., 3405 Perkins Ave., Cleveland 14, Ohio—NP, NF
Clarke Instrument Corp., 910 King St., Silver Spring, Md.—NA
Edin Co., 207 Main St., Worcester 8, Mass.—NP, NF, NE
Electric Tachometer Corp., 2218 Vine St., Philadelphia 3, Pa.—NF
Electro-Tech Equipment Co., 117 Lafayette St., New York 13, N. Y.—NP, NF
Esterline-Angus Co., P. O. Box 596, Indianapolis 6, Ind.—NP, NF, ND, NE
Fielden Electronics Inc., 1171 N. Y. Ave., Huntington Station, N. Y.—NP, NF
Gale Dorothea Mechanisms, 37-61 85th St., Jackson Heights, L. I., N. Y.—NE
General Cement Mfg. Co., 919 Taylor Ave., Rockford, Ill.—ND
Gorrell & Gorrell, Haworth, N. J.—NP, NF, ND, NE, NA
Hathaway Instrument Co., 1315 S. Clarkson St., Denver, Colo.—NP, NF
Heiland Research Corp., 130 E. 5th Ave., Denver 9, Colo.—NP, NF
Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—NP
Leupold & Stevens Instruments, 4445 N. E. Glisan St., Portland 13, Ore.—NF
National Cine Equipment, Inc., 20 W. 22nd St., New York 10, N. Y.—NE
North American Philips Co., 100 E. 42 St., New York 17, N. Y.—NF
Press Wireless Mfg. Co., Cantaigue Rd., Hicksville, L. I., N. Y.—NP, NF
Sanborn Co., 39 Osborn St., Cambridge 39, Mass.—NF, NP
Sound Apparatus Co., Stirling, N. J.—NF, NP
Southwestern Industrial Electronic Co., 2831 Post Oak Rd., Houston 19, Texas—NP, NF
Stancil-Hoffman Corp., 1016 N. Highland Ave., Hollywood 38, Calif.—NE
U. S. Gauge Div., American Machine & Metals Inc., Sellersvills, Pa.—NP, NF
Zernickow Co., O., 15 Park Row, New York 17, N. Y.—NP

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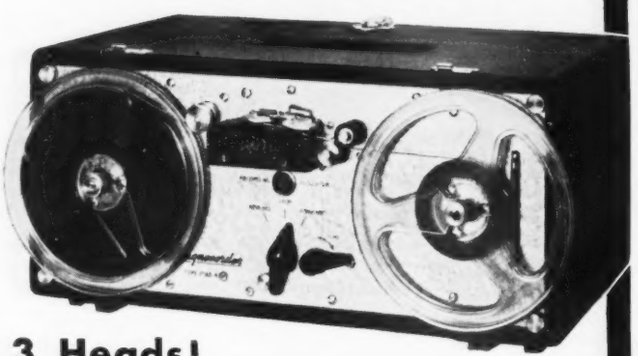
...EVERY PURSE!



3 Heads!

PT63-A to MONITOR YOUR MAGNECORDINGS

Three separate heads — *erase, record,* and *playback* for monitoring from tape — prevent recording errors. Same high fidelity and flexibility as the Magnecorder PT6-A — the world's most widely used professional tape recorder. New PT63-J Amplifier has separate playback and recording amplifiers to monitor from the tape. Includes 10 watt audio amplifier which also will drive external speaker

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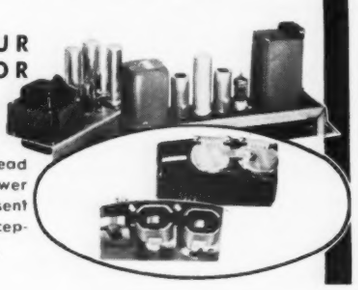
KIT 101

Conversion kit includes a three-head unit, monitor amplifier and power supply to modernize your present PT6-A. Head unit plugs into receptacles for present two-head unit.



The New PT-7 Series

3 Heads (erase, record, playback for monitoring from tape) in single housing, yet separately alignable, replaceable. New positive drive. 2-speed hysteresis-synchronous motor. Push-button controls can be remotely operated. Uses 7" or 10½" N.A.B. reels. 3 channel portable amplifier has high-level mixing.

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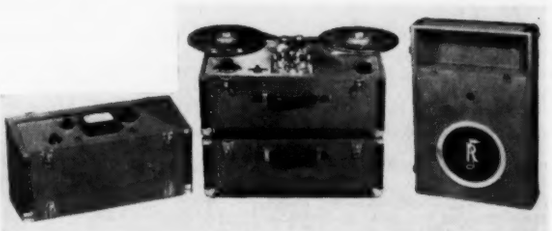

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R-5C	Console	$3000.00

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Tape reels and flanges ..... QH
Paper rolls ..... QP
Tape splicers ..... QE
Tape ..... QT
Wire ..... QW

Acton Co., Inc., H. W., 370 Seventh Ave., New York 1, N. Y.—QC, QR
Advance Recording Products, 36-12 34 St., Long Island City, N. Y.—QD
Alfax Paper & Engineering Co., 46 Riverside Ave., Brockton, Mass.—QP
Allied Recording Products Co., 21-09 43rd Ave., Long Island City 1, N. Y.—QD
American Electric Cable Co., 181 Appleton St., Holyoke, Mass.—QW
American Film Registry, 28 E. Jackson Blvd., Chicago 4, Ill.—QF, QT
American Precision Dial Co., 314 Washington St., Newton, Mass.—QD
Ampex Electric Corp., 1414 El Camino Real, San Carlos, Calif.—QH, QT
Amplifier Corp. of America, 398 Broadway, New York 13, N.Y.—QT
Ansco Div., General Aniline & Film Corp., Binghamton, N. Y.—QF
Arc Radio Corp., 523 Myrtle Ave., Brooklyn 5, N. Y.—QT
Audio Devices, Inc., 444 Madison Ave., New York 22, N. Y.—QT, QD, QC, QR
Audio-Master Co., 23 W. 45 St., New York 19, N. Y.—QT
Blacher, B., 752 Broadway, New York 3, N. Y.—QF, QP, QT
Brush Development Co., 3405 Perkins Ave., Cleveland 14, Ohio—QR
Caltron Products, 1406 S. Hobart Blvd., Los Angeles 6, Calif.—QD, QC, QR
Camera Equipment Co., 1600 Broadway, New York 19, N. Y.—QG, QA
Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—QT
Clarkstan Corp., 11921 W. Pico Blvd., Los Angeles 64, Calif.—QR
Colonial Films, 2118 Mass. Ave. N. W., Washington 8, D. C.—QF
Compco Corp., 2251 W. St. Paul Ave., Chicago 47, Ill.—QG, QH
Crosby Enterprises, Bing, 9028 Sunset Blvd., Los Angeles 46, Calif.—QT
Cummins Business Machines Corp., 4740 Ravenswood Ave., Chicago 40, Ill.—QA
Diamond Phonograph Needle, Div. Royal Diamond Tool Co., 172 Green St., Boston 30, Mass.—QR, QC
Duotone Co., Locust St., Keyport, N. J.—QT, QD, QC, QR
DuPont de Nemours & Co., E. I., Wilmington, Dela.—QF
Eastman Kodak Co., 343 State St., Rochester 4, N. Y. QF, QG
Edin Co., 207 Main St., Worcester 8, Mass.—QP
Electrovox Co., 60 Franklin St., E. Orange, N. J.—QC, QR, QQ
Engineering Associates, 434 Patterson Rd., Dayton 9, Ohio—QF
Etraco Mfg. Co., Woods Church Rd., Flemington, N. J.—QW
Fairchild Recording Equipment Corp., 154 St. & 7th Ave., Whitestone, N. Y.—QT
Fidelitone Inc., 1616 Devon Ave., Chicago 26, Ill.—QT, QW
Film Associates, Inc., 440 E. Schantz Ave., Dayton 9, Ohio—QT, QD, QC
Gates Radio Co., Quincy, Ill.—QT, QW, QD, QC, QR
Gatti Inc., Aurele M., 524 E. Washington St., Trenton 9, N. J.—QR
General Cement Mfg. Co., 919 Taylor Ave., Rockford, Ill.—QW, QC, QR
Goldberg Bros., 1745 Wazee St., Denver, Colo—QG
Gorrell & Gorrell, Haworth, N. J.—QP
Gray Research & Development Co., 16 Arbor St., Hartford 1, Conn.—QR
Hart & Co., Frederick, 837 Main St., Poughkeepsie, N. Y.—QF, QT, QC, QR
Indiana Steel Products Co., 6 N. Michigan, Chicago 2, Ill.—QT
Industrial Cinema Service, 221 N. La Salle St., Chicago, 1, Ill.—QF, QT, QW
International Movie Producers' Service, 515 Madison Ave., New York 22, N. Y.—QF, QT
Jensen Industries Inc., 329 S. Wood St., Chicago 12, Ill.—QC, QR
Kin-O-Lux, Inc., 105 W. 40th St., New York 18, N. Y.—QF
Knickerbocker Annunciator Co., 75 Murray St., New York 7, N. Y.—QW

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Tell-you-what-we're-gonna-do:

So many of our recording friends have been sending in sample-offer coupons in triplicate that we have decided that our stuff may even be good enough to stop giving it away.

Accordingly, for those genuinely interested in maybe using the same Soundcraft recording media the other experts use, we offer absolutely free (use the coupon) a brand new six-page three-color catalog and price list, each one of which set us back about 15 cents.

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Third, we'll put you on the Soundcraft propaganda list so you can read all the tripe that we are currently disgorging.

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Address _____

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Magnetic Recorders Co., 7120 Melrose Ave., Los Angeles 46, Calif.—QP, QT, QW, QD, QC, QR
Michigan Film Library, 15745 Rosemount, Detroit 23, Mich.—QF, QT
Miles Reproducer Co., 812 Broadway, New York 3, N. Y.—QC, QR
Miller Mfg. Co., M. A., 1165 E. 43rd St., Chicago 15, Ill.—QC, QR
Minnesota Electronics Corp., 97 E. 5th St., St. Paul 1, Minn.—QQ, QB
Minnesota Mining & Mfg. Co., 900 Fauquier Ave., St. Paul 6, Minn.—QT, QH, QA
Mystik Adhesive Products, 2635 N. Kildare Ave., Chicago 39, Ill.—QA
Neumade Products Corp., 330 W. 42nd St., New York 18, N. Y.—QE, QG
North American Philips Co., 100 E. 42 St., New York 17, N. Y.—QT, QC
Peirce Wire Recorder Corp., 1328 Sherman Ave., Evanston, Ill.—QW
Permo, Inc., 6415 Ravenswood Ave., Chicago 26, Ill.—QT, QW, QC, QR
Pfanstiehl Chemical Co., 104 Lakeview Ave., Waukegan, Ill.—QR
Phonograph Needle Mfg. Co., 42 Dudley St., Providence 5, R. I.—QR
Poinsettia, Inc., 112 Cedar Ave., Pitman, N. J.—QA
Prestoseal Mfg. Corp., 38-01 Queens Blvd., Long Island City, N. Y.—QE
Radio Corp. of America, RCA-Victor Div., Camden, N. J.—QT, QC
Rangertone Inc., 73 Winthrop St., Newark 4, N. J.—QT
Raytheon Mfg. Co., 138 River St., Waltham, Mass.—QT, QD, QC
Recordisc Corp., 395 Broadway, New York 13, N. Y.—QT, QD, QC, QR, QW
Recoton Corp., 251 Fourth Ave., New York 10, N. Y.—QD, QC, QR
Reeves Soundcraft Corp., 35-54 36 St., Long Island City 6, N. Y.—QT, QD, QH, QC, QR (See ad P. 63)
Rupp's Assembling & Mfg. Works, 2341 N. Seminary Ave., Chicago 14, Ill.—QW
Sonic Recording Products, Inc., 58 Mill Road, Freeport, L. I., N. Y.—QD
Sound Apparatus Co., Stirling, N. J.—QP
Srepco, Inc., 135 E. 2nd St., Dayton 2, Ohio—QA
Stancil-Hoffman Corp., 1016 N. Highland Ave., Hollywood 38, Calif.—QT
Strandberg Recording Co., 705 Woodland Dr., Greensboro, N. Car.—QA
Tape Recording Apparatus Co., Box 221, Caldwell, N. J.—QB
Tayloreel Corp., 2 Commercial St., Rochester 14, N. Y.—QG
Tetrad Corp., 60 N. Broadway, Yonkers 2, N. Y.—QR
Tressel Television Productions, 2214 E. 75 St., Chicago 49, Ill.—QP
Universal Reels, 9-16 37 Ave., Long Island City, N. Y.—QG
Vallorbs Jewel Co., P. O. Box 958, Lancaster, Pa.—QR
Van Eps Laboratories, Fred, R.D. 2, Plainfield, N. J.—QA

22—Monitors

Antenna phase ..... **UP**
Audio ..... **UA**
Frequency ..... **UF**
Modulation ..... **UM**
Service ..... **UB**
Video line ..... **UV**
Video off-the-air ..... **UO**
Waveform ..... **UH**

Andrew Corp., 363 E. 75 St., Chicago 19, Ill.—UP
Biddle Co., James G., 1316 Arch St., Philadelphia 7, Pa.—UF
Browning Laboratories, Inc., 750 Main St., Winchester, Mass.—UF, UM
Burnett Radio Laboratory, Wm. W. L., 4814 Idaho St., San Diego 16, Calif.—UB
Commercial Radio Monitoring Co., P. O. Box 7037, Kansas City, Mo.—UB
Doolittle Radio, Inc., 7421 S. Loomis Blvd., Chicago 36, Ill.—UF, UM
DuMont Laboratories, Allen B., 1000 Main Ave., Clifton, N. J.—UF, UM, UV, UO, UH
Eidson Electronic Co., PO Box 31, Temple, Texas—UB
Fairchild Recording Equipment Corp., 154 St. & 7th Ave., Whitestone, N. Y.—UO
Federal Telecommunication Laboratories, 500 Washington Ave., Nutley 10, N. J.—UF, UM, UV, UO
Gates Radio Co., Quincy, Ill.—UF, UM, UP
General Electric Co., Electronics Dept., Syracuse, N. Y.—UF, UM, UP, UV, UO
General Precision Laboratory, 63 Bedford Rd., Pleasantville, N. Y.—UV, UH, UG, UO, UE, UC, UA, UB
General Radio Co., 275 Mass. Ave., Cambridge 39, Mass.—UF, UM, UH
Hazeltine Electronics Corp., 58-25 Little Neck Parkway, Little Neck, L. I., N. Y.—UM
Hewlett-Packard Co., 395 Page Mill Rd., Palo Alto, Calif.—UF, UM
Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—UF, UM
Holl Audio Industries, P. O. Box 1230, Hollywood 28, Calif.—UA
Industrial Television, Inc., 359 Lexington Ave., Clifton, N. J.—UV-UO
Intervox Corp., 2701 California Ave., Seattle 6, Wash.—UF
Jamaica Television Mfg. Co., 95-26 Sutphin Blvd., Jamaica 4, L. I., N. Y.—UV, UO
Jones Electronics Co., M. C., 96 N. Main St., Bristol, Conn.—UO
Lampkin Laboratories, Inc., Bradenton, Fla.—UF
Link Radio Corp., 125 W. 17 St., New York 11, N. Y. UF, UM
Motorola, Inc., 4545 Augusta Blvd., Chicago 51, Ill.—UF, UM
National-Simplex-Bludworth, Inc., 92 Gold St., New York 7, N. Y.—UO
Panoramic Radio Products, Inc., 10 S. 2nd Ave., Mt. Vernon, N. Y.—UF, UM
Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.—UV
Polarad Electronics Corp., 100 Metropolitan Ave., Brooklyn 11, N. Y.—UV, UO, UH
Press Wireless Mfg. Co., Cantiague Rd., Hicksville, L. I., N. Y.—UF
Radio Corp. of America, RCA-Victor Div., Camden, N. J.—UF, UM, UP, UV, UO, VH
Radio Engineering Laboratories, 36-40 37 St., Long Island City 1, N. Y.—UA
Raytheon Mfg. Co., 138 River St., Waltham 54, Mass.—UF, UM, UP, UV
Reeves-Hoffman Corp., 321 Cherry St., Carlisle, Pa.—UF
Reeves Soundcraft Corp., 35-54 36 St., Long Island City 6, N. Y.—UV, UO
Republic Television, Inc., 7 E. Madison Ave., Dumont, N. J.—UV
Sylvania Electric Products Co., 1740 Broadway, New York 19, N. Y.—UM
Telectro Industries Corp., 35-16 37th St., Long Island City 1, N. Y.—UF, UM
Television Equipment Corp., 238 William St., New York 7, N. Y.—UV
Television Utilities Corp., 1261 Broadway, New York 1, N. Y.—UV, UO
Tel Instrument Co., 50 Paterson Ave., E. Rutherford, N. J.—UV
Triplett Electrical Instrument Co., Bluffton, Ohio, UF, UM
Weymouth Instrument Co., 1440 Commercial St., E. Weymouth 89, Mass.—UF

23—Telemetering and Servo Controls

Telemetering equipment ..... **TTT**
Servo devices ..... **TTS**

Akeley Camera & Instrument Corp., 175 Varick St., New York 14, N. Y.—TTT, TTS
American Electroneering Co., 2112 S. LaBrea, Los Angeles 16, Calif.—TTS
American Hydromath Co., 145 W. 57 St., New York 19, N. Y.—TTS
Applied Science Corp., P. O. Box 44, Princeton, N. J.—TTT
Arlington Electric Products, Inc., 500 W. 52 St., New York 19, N. Y.—TTT, TTS
Audio-Tone Oscillator Co., 237 John St., Bridgeport 3, Conn.—TTT, TTS
Bendix Aviation Corp., Pacific Division, 11600 Sherman Way, N. Hollywood, Calif.—TTT, TTS
Bendix Aviation Corp., Eclipse-Pioneer Div., Teterboro, N. J.—TTS
Berkeley Scientific Co., 6th & Nevin Aves., Richmond, Calif.—TTT
Bunnell & Co., J. H., 81 Prospect St., Brooklyn 1, N. Y.—TTT, TTS
CGS Laboratories, 36 Ludlow St., Stamford, Conn.—TTT, TTS
Clarke Instrument Corp., 910 King St., Silver Spring, Md.—TTT
Cook Electric Co., 2700 Southport Ave., Chicago 14, Ill.—TTS
Crosby Enterprises, Bing, 9028 Sunset Blvd., Los Angeles 46, Calif.—TTT
Electric Regulator Corp., 1938 Park Ave., New York 35, N. Y.—TTS
Electro-Mechanical Research, Inc., Ridgefield, Conn.—TTT
Electronic Associates, Inc., Long Branch, N. J.—TTS
Electronic Research & Mfg. Corp., 1420 E. 25 St., Cleveland 14, Ohio—TTT
Esterline-Angus Co., P. O. Box 596, Indianapolis 6, Ind.—TTT
Flader Inc., Frederic, 583 Division St., N. Tonawanda, N. Y.—TTT, TTS
Gaveco Laboratories, 2 East End Ave., New York 21, N. Y.—TTS
General Electric Co., Electronics Dept., Syracuse, N. Y.—TTT, TTS
Giannini & Co., G. M., 254 W. Colo. St., Pasadena 1, Calif.—TTT, TTS
Gulton Mfg. Corp., Metuchen, N. J.—TTT
Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—TTS, TTT
Industrial Electronics, 2457 Woodward Ave., Detroit, 1, Mich.—TTS
Ionic Equipment Co., 1705 N. Kenmore, Los Angeles 27, Calif.—TTT
Ketay Mfg. Corp., 555 Broadway, New York 12, N. Y.—TTT, TTS
Kollsman Instrument Div., Square D. Co., 80-08 45th Ave., Elmhurst, L. I., N. Y.—TTS
Krohn-Hite Instrument Co., 580 Mass. Ave., Cambridge 39, Mass.—TTS, TTT
Leupold & Stevens Instruments, 4445 N. E. Glisan St., Portland 13, Ore—TTS, TTT
Melpar, Inc., 452 Swann Ave., Alexandria, Va.—TTT
Minneapolis-Honeywell Regulator Co., 2712 4th Ave. S., Minneapolis, Minn.—TTT, TTS
Motorola, Inc., 4545 Augusta Blvd., Chicago 51, Ill.—TTT
National Electronics Laboratories, 1713 Kalorama Rd., N. W., Washington 9, D. C.—TTT
North American Instrument Co., 23 E. 26 St., New York 10, N. Y.—TTS
Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.—TTT
Raytheon Mfg. Co., Waltham 54, Mass.—TTS, TTT
Reeves Instrument Corp., 215 E. 91 St., New York 28, N. Y.—TTS
Rosen Eng'g Products, Raymond, 32nd & Walnut Sts., Philadelphia 4, Pa.—TTT
Schaevitz Engineering, Crescent Blvd. & Drexel Ave., Camden, N. J.—TTT, TTS
Servo Corp. of America, New Hyde Park, N. Y.—TTS, TTT
Servomechanisms, Inc., Old Country & Glen Cove Rds., Mineola, L. I., N. Y.—TTS
Servo-Tek Products Co., 4 Godwin Ave., Paterson 1, N. J.—TTT, TTS
Stancil-Hoffman Corp., 1016 N. Highland Ave., Hollywood 38, Calif.—TTT, TTS
Standard Electronic Research Corp., 2 East End Ave., New York 21, N. Y.—TTS
Telectro Industries Corp., 35-16 37 St., Long Island City 1, N. Y.—TTT, TTS
Transicoil Corp., 114 W. Worth St., New York 13, N. Y.—TTS
Transmitter Equipment Mfg. Co., 345 Hudson St., New York 14, N. Y.—TTS
Westinghouse Electric Corp., Construction & Communications Sec. 10-L, E. Pittsburgh, Pa.—TTT, TTS

AUDIO EQUIPMENT

24—General

Special baffles & forms ..... **XA**
Cable ..... **XC**
Connectors ..... **XD**
Patch cords & plugs ..... **XP**
Earphones ..... **XE**
Loudspeakers ..... **XL**
Cable markers ..... **XF**
Shielding ..... **XS**
Sound treatment ..... **XB**
Tweeters ..... **XT**

Airadio, Inc., Melrose Pl., Stamford, Conn.—XD
Alden Products Co., 117 N. Main St., Brockton, Mass.—XC, XD, XP
Alpha Wire Corp., 50 Howard St., New York 14, N. Y.—XC
Altec Lansing Corp., 1161 N. Vine St., Hollywood 38, Calif.—XL, XT
American Electric Cable Co., 181 Appleton St., Holyoke, Mass.—XC
American Electroneering Co., 2112 S. LaBrea, Los Angeles 16, Calif.—XE
American Phenolic Corp., 1830 S. 54 Ave., Chicago 50, Ill.—XD, XC
Arc Radio Corp., 523 Myrtle Ave., Brooklyn 5, N. Y.—XL
Armstrong Cork Co., Lancaster, Pa.—XB
Audio Equipment Co., 80-20 45 Ave., Elmhurst, L. I., N. Y.—XL
Audio Pacific Co., 6110 Santa Montica Blvd., Hollywood 38, Calif.—XL
Ballantyne Co., 1701 Davenport St., Omaha, Nebr.—XL, XT, XA
Bell Sound Systems, Inc., 555 Marion Rd., Columbus 7, Ohio.—XL
Best Mfg. Co., 1200 Grove St., Irvington, N. J.—XL, XT

Bozak Co., R. T., 90 Montrose Ave., Buffalo 14, N. Y.—XL
Brociner Electronics Laboratory, 1546 Second Ave., New York 28, N. Y.—XL
Bud Radio, Inc., 2118 E. 55 St., Cleveland 3, Ohio—XS, XC
Buggie & Co., H. H., 726 Stanton St., Toledo 1, Ohio—XD
Burndy Engineering Co., 107 Bruckner Blvd., New York 54, N. Y.—XD
Cannon Co., C. F., Springwater, N. Y.—XE
Cannon Mfg. Corp., 3209 Humboldt St., Los Angeles 31, Calif—XD, XP
Capitol Stage Lighting Co., 527 W. 45 St., New York 19, N. Y.—XC, XD
Carbonneau Industries, 21 Ionia Ave. N. W., Grand Rapids 2, Mich.—XL
Castlewood Mfg. Co., 12th & Burnett, Louisville 10, Ky.—XA
Celotex Co., 120 S. LaSalle St., Chicago, Ill.—XB
Cinaudagraph Speakers, Inc., 1401 Fairfax Trafficway, Kansas City, Kans., XT, XL
Cinch Mfg. Corp., 2460 W. George St., Chicago 18, Ill.—XD
Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—XC, XD
Coleman Cable & Wire Corp., 4515 W. Addison St., Chicago 41, Ill.—XC
Conn. Telephone & Electric Corp., 70 Britannia St., Meriden, Conn.—XE, XP
Cornish Wire Co., 15 Park Row, New York 7, N. Y.—XC
DeVry Corp., 1111 Armitage Ave., Chicago 14, Ill.—XL
Diamond Mfg. Co., 7 North Ave., Wakefield, Mass.—XD
D-X Radio Products Co., 2300 W. Armitage Ave., Chicago, Ill.—XL
Electrix Corp., 150 Middle St., Pawtucket, R. I.—XD
Electro Sales Co., Inc., 399 Atlantic Ave., Boston 10, Mass.—XC
Etraco Mfg. Co., Woods Church Rd., Flemington, N. J.—XC
Electro-Voice Inc., Buchanan, Mich.—XL
Federal Telephone & Radio Corp., 100 Kingsland Rd., Clifton, N. J.—XC
Gates Radio Co., Quincy, Ill.—XC, XD, XE, XL
General Cement Mfg. Co., 919 Taylor Ave., Rockford, Ill.—XD
General Electric Co., Electronics Dept., Syracuse, N. Y.—XC, XD, XE, XL, XT
Hamilton Electronics, 2726 Pratt Ave., Chicago 45, Ill.—XL
Hallett Mfg. Co., 1601 W. Florence Ave., Inglewood, Calif.—XS
Heppner Mfg. Co., P. O. Box 612, Round Lake, Ill.—XL
Holl Audio Industries, P. O. Box 1230, Hollywood 28, Calif.—XL
Industrial Electrical Works, 1509 Chicago St., Omaha 2, Nebr.—XC, XD
Insulite Co., 1100 Builders Exchange, Minneapolis, Minn.—XB
Jensen Mfg. Co., 6601 S. Laramie Ave., Chicago, Ill.—XL, XT
Johns-Manville Corp., 22 E. 40 St., New York, N. Y.—XB
Jones, Howard B., 1026 S. Homan Ave., Chicago 24, Ill.—XD, XP (See ad P. 66)
Joy Mfg. Co., Mines Equipment Div., 4235 Clayton Ave., St. Louis 10, Mo.—XD
Keystone Electronics Co., 50 Franklin St., New York 13, N. Y.—XC, XD
Kimberley-Clark Corp., Insulation Div., Neenah, Wisc.—XB
Kings Electronics Co., 811 Lexington Ave., Brooklyn 21, N. Y.—XD
Klipsch & Associates, Hope, Ark.—XL, XT
Kupfrian Mfg. Co., Box 714, Binghamton, N. Y.—XS
Knickerbocker Annunciator Co., 75 Murray St., New York 7, N. Y.—XC
Lansing Sound Inc., James B., 4221 S. Lincoln Blvd., Venice, Calif.—XL, XT
Lenz Electric Mfg. Co., 1751 N. Western Ave., Chicago 47, Ill.—XC
Libra Film Distributors, 6525 Sunset Blvd., Hollywood 28, Calif.—XC, XD, XE, XL
Link Radio Corp., 125 W. 17 St., New York 11, N. Y.—XC, XE, XD, XL
Magnetic Recorders Co., 7120 Melrose Ave., Los Angeles 46, Calif.—XC, XD, XE, XL
Midwest Automatic Control Co., 510 Third St., Des Moines 9, Iowa—XC
Miles Reproducer Co., 812 Broadway, New York 3, N. Y.—XC, XD, XE
Murdock Co., Wm. J., 158 Carter St., Chelsea, Mass.—XE
National Gypsum Co., 325 Delaware Ave., Buffalo, N. Y.—XB
Neptune Electronics Co., 433 Broadway, New York 13, N. Y.—XD
Oxford Electric Corp., 3911 S. Michigan Ave., Chicago 15, Ill.—XL
Perfection Electric Co., 829 S. State St., Chicago 5, Ill.—XL
Perm-O-Flux Corp., 4900 W. Grand Ave., Chicago 39, Ill.—XE, XL
Radio Corp. of America, RCA-Victor Div., Camden, N. J. XC, XD, XE, XL, XT
Radio-Music Corp., 84 S. Water St., Port Chester, N. Y.—XL
Rapid Specialties Co., 325 W. Huron St., Chicago 10, Ill.—XD
Raytheon Mfg. Co., 138 River St., Waltham 54, Mass—XL
Roanwell Corp., 662 Pacific St., Brooklyn 17, N. Y.—XD, XE

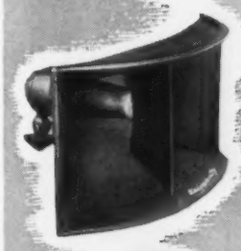
There's a *University* Loudspeaker

RUGGED! DEPENDABLE! VERSATILE!

FOR EVERY COMMERCIAL AND INDUSTRIAL APPLICATION

TRUMPETS Model 7102 exemplifies the rugged construction and progressive engineering behind every University product. Model 7102 is the *only* loudspeaker ever approved by Underwriters' Labs for Class II Groups E, F, & G hazardous area duty. Features include re-entrant trumpet (pioneered by University) for compactness and greater efficiency, heavy duty 25 watt driver unit with exclusive University "W" shaped Alnico V magnet, and *built-in* line matching transformer with impedances of 16, 45, 500, 1000, 1500, and 2000 ohms. See general catalog for trumpets of all sizes.

BREAKDOWN-PROOF DRIVER UNITS Model PA-30 embodies features developed by University and never successfully imitated. Ratings are conservative, and construction is to well known University standards which have made our drivers famous for their dependable performance. PA-30 is rated at 30 watts, with response 80-10,000 cps, and is the *first* to have a multi-tap built-in line matching transformer. Exclusive "rim centering" construction of mechanism and use of University "W" shaped Alnico V magnet insures high conversion efficiency, permanent voice coil alignment regardless of shock or vibrations. Weatherproofed throughout.

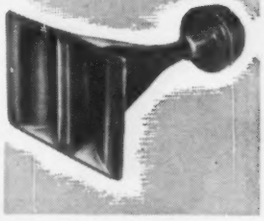


PAGING AND INTERCOM SPEAKERS These feature reflex air columns with hermetically sealed driver units. They are widely used for intercommunication and paging of all types. Efficiency is high and reproduction exceptional at any volume level. Directional, radial, or bi-directional types available. Weather-proof finishes permit use anywhere. Typical of University pace-setting design is the Cobra-12 illustrated, which provides optimum area coverage with minimum power input. Power rating is 12 watts, frequency response 250-10,000 cps, dispersion angle 60° x 120°. Swivel mounting bracket provides full flexibility.

SUBMERGENCE-PROOF SPEAKERS These types are designed for use where extreme ruggedness and immunity to spray, gases, live steam or dust are essential. Function even under water, drain automatically, operate continuously regardless of exposure. Models available for directional or radial projection, wall or bulkhead mounting, swivel mount and with or without built-in line matching transformer and attenuator. Design is ideal for railroad use, shipboard, industries, docks, rough mobile work, etc. Model MM-2, illustrated, is rated at 15 watts continuous IPM, frequency 300-6000 cps, impedance 16 ohms.

FOR ALL HIGH FIDELITY REPRODUCTION REQUIREMENTS

WIDE RANGE CONE SPEAKERS Model 6201 comprises a superb 12" cone speaker with a driver type tweeter mounted coaxially. The cone speaker features a 24 oz. "W" shaped Alnico magnet and edge treated cone for distortion-free low frequency response. Tweeter has wide angle horn. A built-in LC crossover network and external high frequency attenuator are included. Capacity is 25 watts, I.P.M., response 45-15,000 cps, impedance 8 ohms. Other cone speakers for high fidelity, splashproof or blastproof service also available.



HI-FREQUENCY TWEETERS University offers a complete line of single and double tweeter units for both 2000 and 600 cycle crossover. Models are available for medium or extremely wide sound distribution. A complete line of accessories are included—crossover networks, adapter for mounting tweeter on a standard cone speaker, etc. These tweeters may be added to any standard amplifier and speaker to provide the finest in high fidelity reproduction—and at a very low cost.

WRITE DEPT. H TODAY FOR YOUR FREE COPY OF THE NEW 24-PAGE UNIVERSITY TECHNILOGUE — A COMBINED TECHNICAL MANUAL AND CATALOG — INVALUABLE FOR YOUR FILES.

University LOUDSPEAKERS
INCORPORATED
80 SOUTH KENSICO AVE., WHITE PLAINS, NEW YORK

Directory of Manufacturing in January

Each January issue of TELE-TECH will contain a complete manufacturers' directory covering parts, components and materials for initial equipment and replacement.

Rola Co., 2330 Superior Ave., Cleveland 14, Ohio—XT, XL

Rupp's Assembling & Mfg. Works, 2341 N. Seminary Ave., Chicago 14, Ill.—XC

Schott Co., Walter L., 9306 Santa Monica Blvd., Beverly Hills, Calif.—XD

Simpson Mfg. Co., Mark, 32-28 49 St., Long Island City 3, N. Y.—XT

Sisalkraft Co., 205 W. Wacker Dr., Chicago 6, Ill.—XS

Stancil-Hoffman Corp., 1016 N. Highland Ave., Hollywood 38, Calif.—XE, XL

Standard Speaker Mfg. Co., 113-35 200 St., St. Albans 12, N. Y.—XL, XT

Stephens Mfg. Co., 8538 Warner Dr., Culver City, Calif.—XL

Stromberg-Carlson Co., 100 Carlson Rd., Rochester 3, N. Y.—XL

Switchcraft, Inc., 1328 N. Halsted St., Chicago 22, Ill.—XP

Taffet Radio & Television Co., 2530 Belmont Ave., Bronx 58, N. Y.—XC

Tarrytown Metalcraft Corp., 82 Chestnut St., Tarrytown, N. Y.—XL

Telex, Telex Park, Minneapolis, Minn.—XE

Topflight Tape Co., 52 S. Duke St., York, Pa.—XF

Trimm, Inc., Libertyville, Ill.—XP

University Loudspeakers, Inc., 80 S. Kensico Ave., White Plains, N. Y.—XL, XT (See ad P. 65)

Univox Corp., 83 Murray St., New York 7, N. Y.—XC, XD

U. S. Gypsum Co., 300 W. Adams St., Chicago 6, Ill.—XB

Western Insulated Wire Co., 1001 E. 62 St., Los Angeles, Calif.—XC

Western Lithograph Co., 600 E. Second St., Los Angeles 54, Calif.—XF

Whitney Blake Co., New Haven 14, Conn.—XC

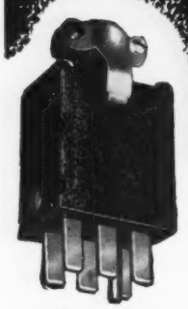
25—*Test Equipment*

Amplifiers, special ..... YC
Attenuators, AF ..... YA
Attenuators, RF ..... YR
Boxes, decade resistance ..... YE
Bridges, capacity ..... YYC
Bridges, impedance ..... YB
Bridges, resistance ..... YD
Design, custom ..... YY
Detector, vacuum leak ..... YYF
Generators, composite TV signal ..... YYJ
Generators, grating ..... YYE
Generators, micro-wave signal ..... YYA
Generators, noise ..... YYB
Generators, signal ..... YS
Generators, square wave ..... YYD
Generators, sweep ..... YK
Generators, timing marker ..... YJ
Indicators, resonance ..... YYK
Instruments, special laboratory ..... YI
Q-Meters ..... YYL
Meters, distortion and noise ..... YN
Meters, frequency ..... YYM
Meters, grid dip ..... YX
Meters, output power ..... YZ
Meters, wow and flutter ..... YYI
Microvolter, audio frequency ..... YYG
Oscillators, audio ..... YO
Oscillators, UHF ..... YU
Oscilloscopes ..... YP
Records, frequency test ..... YW
Sets, field strength measuring ..... YF
Sets, insulation test ..... YM
Sets, sound level measuring ..... YL
Sets, transmission measuring ..... YT
Standards, frequency ..... YQ
Testers, tube ..... YG
Voltmeters, vacuum tube ..... YV
Volt-ohm-millammeters ..... YR
Units, decade inductor ..... YYH

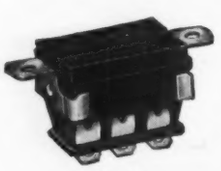
OMISSIONS

In this directory, intended primarily as a buying guide for station and studio equipment, listings have been omitted in all cases where manufacturers have reported products not included in the categories of this directory, or returned our questionnaire too late, or, after three requests, failed to return our questionnaire or otherwise verify the manufacturer's activity.

FOR PUBLIC ADDRESS, RADIO, and kindred fields, specify JONES 400 SERIES PLUGS AND SOCKETS of proven quality!



P-406-CCT



S-406-AB

Double Contact Area

Phosphor bronze knife-switch socket contacts engage both sides of flat plug contacts.

Socket contacts phosphor bronze, cadmium plated. Plug contacts hard brass, cadmium plated. Insulation molded bakelite. Plugs and sockets polarized. Steel caps with baked crackle enamel. 2, 4, 6, 8, 10, 12 contacts. Cap or panel mounting.

Information on complete line, in Jones Catalog 17: Electrical Connecting Devices, Plugs, Sockets, Terminal Strips. Write

Jones
HOWARD B. JONES DIVISION
CINCH MANUFACTURING CORPORATION
CHICAGO 24, ILLINOIS
SUBSIDIARY OF UNITED-CARR FASTENER CORP

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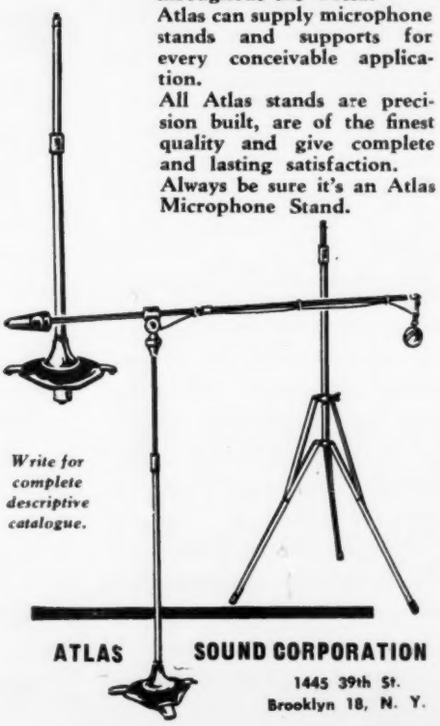
PROFESSIONAL BOOM AND MIKE STANDS

Atlas Microphone Supports are used by leading Radio and Television stations throughout the world.
Atlas can supply microphone stands and supports for every conceivable application.
All Atlas stands are precision built, are of the finest quality and give complete and lasting satisfaction.
Always be sure it's an Atlas Microphone Stand.

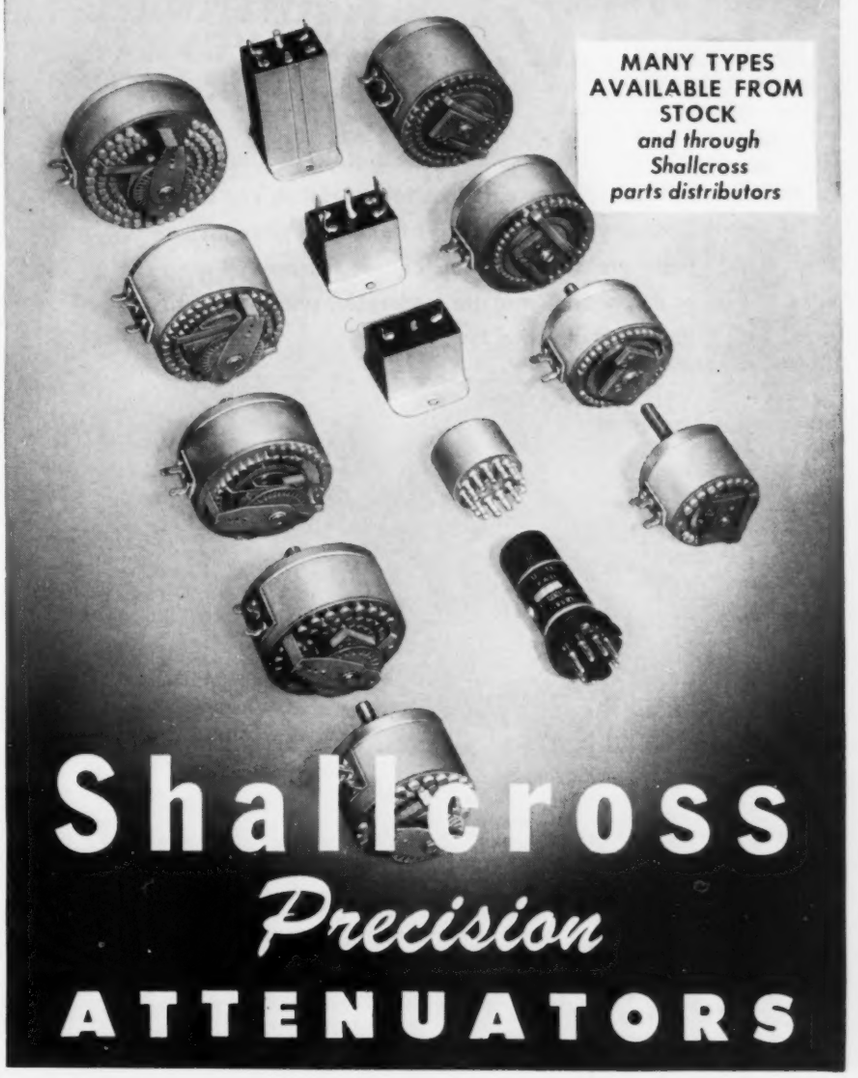


Write for complete descriptive catalogue.

ATLAS SOUND CORPORATION
1445 39th St.
Brooklyn 18, N. Y.

Aerolux Light Corp., 653 11th Ave., New York 19, N. Y.—YY
Airborne Instruments Laboratory, 160 Old Country Rd., Mineola, L. I., N. Y.—YK
Aircraft Electronics Associates, 1031 New Britain Ave., Hartford 10, Conn.—YI, YY
Aircraft Radio Corp., Boonton, N. J.—YS, YY
Airlectron, Inc., 295 Bloomfield Ave., Caldwell, N. J.—YP, YV
American British Technology, Inc., 57 Park Ave., New York 16, N. Y.—YP, YA, YO
American Electroneering Co., 2112 S. LaBrea, Los Angeles 16, Calif.—YA, YR, YS, YF, YT, YQ
American Television, Inc., 523 S. Plymouth Ct., Chicago 5, Ill.—YYJ
American Time Products, Inc., 580 Fifth Ave., New York 19, N. Y.—YQ
Amplifier Corp. of America, 398 Broadway, New York 13, N. Y.—YYI
Applied Science Corp., P. O. Box 44, Princeton, N. J.—YY
Approved Electronic Instrument Corp., 142 Liberty St., New York 6, N. Y.—YS, YF
ARF Products, Inc., 7627 Lake St., River Forest, Ill.—YA, YR, YS
Associated Research, Inc., 3758 W. Belmont Ave., Chicago 18, Ill.—YI
Atlas Coil Winders Inc., Liston Folb Div., 392 State St., Stamford, Conn.—YC
Audio Development Co., 2833 13th Ave. S. Minneapolis 7, Minn.—YL
Audio Instrument Co., 420 Lexington Ave., New York 17, N. Y.—YN, YY, YI
Audio-Tone Oscillator Co., 237 John St., Bridgeport 3, Conn.—YO
Ballantine Laboratories, Boonton, N. J.—YV
Barber Laboratories, Alfred W., 32-44 Francis Lewis Blvd., Flushing, N. Y.—YV, YY, YI
Barker & Williamson, 237 Fairfield Ave., Upper Darby, Pa.—YN, YO
Barnes Development Co., 213 W. Baltimore Pike, Lansdowne, Pa.—YI, YY
Beam Instrument Corp., 511 Fifth Ave., New York 17, N. Y.—YP
Berkeley Scientific Co., 6th & Nevin Aves., Richmond, Calif.—YQ
Berkshire Laboratories, P. O. Box 88, Lincoln, Mass.—YJ, YE, YY, YI
Beta Electric Corp., 1762 Third Ave., New York 29, N. Y.—YP, YV, YY
Biddle Co., James G., 1316 Arch St., Philadelphia 7, Pa.—YM
Bliley Electric Co., Union Station Bldg., Erie, Pa.—YQ
Boonton Radio Corp., Boonton, N. J.,—YYK, YYL, YS, YI, YE, YK, YU (See ad P. 70)
Bradshaw Instruments Co., 348 Livingston St., Brooklyn 17, N. Y.—YH
Brown Electro-Measurement Corp., 4635 S. E. Hawthorne Blvd., Portland 15, Ore.—YA, YB, YD
Brown Instrument Div., Minneapolis-Honeywell Regulator Co., Wayne & Roberts Aves., Philadelphia 44, Pa.—YI, YY
Browning Laboratories, Inc., 750 Main St., Winchester, Mass.—YP, YQ, YJ
Buck Engineering Co., 37-41 Marcy St., Freehold, N. J.—YY
Burnett Radio Laboratory, Wm. W. L. 4814 Idaho St., San Diego 16, Calif.—YQ
Calidyne Co., 751 Main St., Winchester, Mass.—YI
Canoga Corp., 14315 Bessemer St., Van Nuys, Calif.—YS, YK
Central Research Laboratories, Red Wing, Minn.—YI
CGS Laboratories, 36 Ludlow St., Stamford, Conn.—YV
Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—YA YT
Clarke Instrument Corp., 910 King St., Silver Spring, Md.—YF
Clarkstan Corp., 11921 W. Pico Blvd., Los Angeles 64, Calif.—YO, YQ, YW
Clippard Instrument Laboratory, 1125 Bank St., Cincinnati, Ohio—YYC
Clough Brengle Co., 6014 Broadway, Chicago 40, Ill.—YB, YD, YS, YO, YT, YK
Coastwise Electronics Co., 130 N. Beaudry Ave., Los Angeles 12, Calif.—YK
Coil Winders, Inc., 61 Bergen St., Brooklyn 2, N. Y.—YA, YR
Cole Instrument Co., 1320 S. Grand Ave., Los Angeles 15, Calif.—YB, YD, YS, YV
Coleman Instruments, Inc., 318 Madison St., Maywood, Ill.—YI
Columbus Electronics Corp., 229 S. Waverly St., Yonkers, N. Y.—YI
Communication Measurements Lab., 120 Greenwich St., New York 6, N. Y.—YP
Consolidated Engineering Corp., 620 N. Lake St., Pasadena 4, Calif.—YYF
Cook Laboratories, 139 Gordon Blvd., Floral Park, L. I., N. Y.—YW
Coral Designs, Box 248, Forest Hills, N. Y.—YY
Corvek Corp., 1005 N. W. 16 St., Portland 9, Ore.—YI, YY
Cosser (Canada) Ltd., 55 W. 42 St., New York 18, N. Y—YP
Crown Industrial Products Co, 1326 W. 69 St., Chicago, Ill.—YD
Dallons Laboratories, 5066 Santa Monica Blvd., Los Angeles 27, Calif.—YF, YQ
Daven Co., 191 Central Ave., Newark 4, N. J.—YA, YR, YD, YS, YN, YO, YL, YT, YV, YZ, YYM, YE (See ad P. 68)
Dawkins Espy Electronic Corp., 11747 W. Pico Blvd, Los Angeles 34, Calif.—YI
Dayco Radio Corp., 915 Valley St., Dayton 4, Ohio—YG
DeciMeter, Inc., 1430 Market St., Denver, Colo.—YU
De-Tec Tronic Laboratories, 1227 N. Clark St., Chicago Ill.—YU

Really Smooth—Outstandingly Quiet—Fully Dependable



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Perhaps you've noticed how frequently Shallcross attenuators now appear in the finest audio or communications equipment? Or how often they are chosen for replacement purposes?

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NOW... R. F. ATTENUATION NETWORK FOR YOUR WORK

To meet the increasing needs for accurate, dependable instruments to attenuate UHF, The Daven Company now offers RF attenuation boxes. These units are notably compact, provide a wide range of attenuation and are moderately priced. All units have zero insertion loss.

Series 640

—SPECIFICATIONS—

CIRCUIT: Pi network.
STANDARD IMPEDANCES: 50 and 73 ohms. Other impedances on request.
RESISTOR ACCURACY: ±2% at D.C.
IMPEDANCE ACCURACY: Terminal impedance of loss network essentially flat from zero to 225 Mc.
RECEPTACLES: A/N Types UG-58/U or UG-185/U.
CABLE PLUGS: May be secured at additional cost.
INSERTION LOSS: Zero.
NO. OF STEPS: Types: 640, 641, 642, 643..... 8 Push Buttons
Types: 650 and 651..... 10 Push Buttons

SERIES	IMPEDANCE	RANGE
640 & 641	50 Ω or 73 Ω	80 Db Total in 1 Db Steps
642 & 643	50 Ω or 73 Ω	100 Db Total in 2 Db Steps
650 & 651	50 Ω or 73 Ω	100 Db Total in 1 Db Steps

—APPLICATIONS—

- In signal and sweep generators.
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- Wide-band amplifiers.
- Pulse amplifiers.
- Any application where attenuation of UHF is required.

For Additional Information Write to TE-15

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Development Engineering Co., 1723 Waugh Dr., Houston 6, Texas—YI
Diamond Mfg. Co., 7 North Ave., Wakefield, Mass.—YY
Douglas Radio Laboratories, 40 Wayland St., Boston 25, Mass.—YI
Dumont Laboratories, Allen B., 1000 Main Ave., Clifton, N. J.—YP, YT, YI

Edin Co., 207 Main St., Wooster 8, Mass.—YC
Electrix Corp., 150 Middle St., Pawtucket, R. I.—YQ
Electrodyne Co., 32 Oliver St., Boston 10, Mass.—YB
Electro-Mechanical Research Inc., Ridgefield, Conn.—YV
Electronic Associates, Inc., Long Branch, N. J.—YQ, YI
Electronic Designs, Inc., Irvington on Hudson, N. Y.—YV, YH
Electronic Instrument Co., 276 Newport St., Brooklyn 12, N. Y.—YS, YO, YP, YF, YV, YG, YK, YH
Electronic Measurements Co., Box 850, Red Bank, N. J.—YS, YN, YO, YQ, YV, YH
Electronic Tube Corp., 1200 E. Mermaid Lane, Philadelphia 18, Pa.—YP, YC, YS
Electronics Research, Inc., Diamond & Ky. Aves., Evansville 4, Ind.—YY
Electro-Tech Equipment Co., 117 Lafayette St., New York 13, N. Y.—YB, YD, YS, YN, YO, YF, YL, YV
Electro-Technic Products, 4602 Montrose Ave., Chicago 41, Ill.—YYF
Elm Laboratories, 18 S. Broadway, Dobbs Ferry, N. Y.—YY
El-Tronics, Inc., 2647 N. Howard St., Philadelphia, Pa.—YY
Engineering Associates, 434 Patterson Rd., Dayton 9, Ohio—YS
Eppley Laboratory, Inc., 12 Sheffield Ave., Newport, R. I.—YI

Fairchild Camera & Instrument Co., 88-06 Van Wyck Blvd., Jamaica 1, N. Y.—YI (See ad P. 69)
Federal Telecommunication Laboratories, 500 Washington Ave., Nutley 10, N. J.—YS, YN, YP, YQ, YY, YE
Federal Telephone & Radio Corp., 100 Kingsland Rd., Clifton, N. J.—YA, YF
Feiler Engineering Co., 945 W. George St., Chicago 14, Ill.—YS, YP, YV, YO, YD
Field Electrical Instrument Co., 109 E. 184 St., New York 53, N. Y.—YI
Flexilab Products Co., 4945 Colorado Blvd., Denver, Colo.—YI
Fluke Engineering Co., John, P. O. Box 755, Springdale, Conn.—YI
Freed Transformer Co., 1718-36 Weirfield St., Brooklyn 27, N. Y.—YB, YS, YN, YO, YT, YQ, YV, YI, YYC, YM, YYL, YYH

Gates Radio Co., Quincy, Ill.—YA, YR, YB, YD, YS, YN, YO, YP, YF, YL, YT, YQ, YV
General Electric Co., Apparatus Dept., Schenectady 5, N. Y.—YS, YN, YO, YP, YL, YI, YY
General Radio Co., 275 Mass. Ave., Cambridge 39, Mass.—YA, YR, YB, YD, YS, YN, YO, YL, YQ, YV, YH, YC, YZ, YI, YE, YM, YU, YYA, YYC, YYD, YY, YYH
Gulton Mfg. Corp., Metuchen, N. J.—YS

Hanover Developments, 401 E. 74 St., New York, N. Y.—YC
Harvey Radio Laboratories, 447 Concord Ave., Cambridge 38, Mass.—YS
Heath Co., Benton Harbor 10, Mich.—YO, YP, YV, YK, YS, YH, YB (See ad P. 6)
Hewlett-Packard Co., 395 Page Mill Rd., Palo Alto, Calif.—YA, YR, YB, YS, YN, YO, YT, YQ, YV, YC, YU, YI, YYD, YYA
Hickok Electrical Instrument Co., 10514 Dupont Ave., Cleveland 8, Ohio—YS, YP, YV, YG, YYE, YZ, YI, YK, YH, YM
Hoffman Radio Corp, 3761 S. Hill St., Los Angeles 7, Calif.—YA, YR, YN, YO, YP
Hycor Co., 7116 Laurel Canyon Blvd., Hollywood, Calif.—YYH

Industrial Electronics, 2457 Woodward Ave., Detroit 1, Mich.—YB, YD, YP, YI
Industrial Instruments, 17 Pollock Ave., Jersey City 5, N. J.—YD
Industrial Television, Inc., 359 Lexington Ave., Clifton, N. J.—YF
Industrial Transformer Corp., Gouldsboro, Pa.—YB
Instrument Electronics Corp., 45-17 Glenwood St., Little Neck, L. I., N. Y.—YV
International Instruments, Inc., 331 East St., New Haven 11, Conn.—YM
International Mutoscope Co., 4401-09 Eleventh St., Long Island City 1, N. Y.—YI
Ionic Equipment Co., 1705 N. Kenmore, Los Angeles 27, Calif.—YP, YF, YY

Jackson Electrical Instrument Co., 16 S. Patterson Blvd., Dayton 1, Ohio—YS, YP, YV (See ad P. 71)
James Knights Co., 101 E. Church St., Sandwich, Ill.—YQ
Jones Electronics Co., M. C., 96 N. Main St., Bristol, Conn.—YB-YT

Kalbfell Laboratories, 1076 Morena Blvd., San Diego 10, Calif.—YA, YR, YI, YYC (See ad P. 70)
Kay Electric Co., 14 Maple Ave., Pine Brook, N. J.—YA, YR, YB, YS, YN, YO, YF, YL, YT, YQ, YK,
Keithley Instruments, 1507 Warrensville Center Rd., Cleveland 21, Ohio—YA, YI, YY
Keystone Electric Co., 2002 N. 31 St., Omaha 4, Nebr.—YY
Kings Electronics Co., Inc., 811 Lexington Ave., Brooklyn 21, N. Y.—YR
Krohn-Hite Instrument Co., 580 Massachusetts Ave., Cambridge 39, Mass.—YO, YI

Lampkin Laboratories Inc., Bradenton, Fla.—YQ
Lavoie Laboratories, Morganville, N. J.—YP, YS, YYD
Lawton Products Co., 624 Madison Ave., New York 22, N. Y.—YY, YI
Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia 44, Pa.—YI
Link Aviation, Binghamton, N. Y.—YY
London Gramaphone Corp., 16 W. 22 St., New York, N. Y.—YW

MacDonald Co., W. S., 38 University Rd., Cambridge, Mass.—YI
Magnetic Recorders Co., 7120 Melrose Ave., Los Angeles 46, Calif.—YA, YR, YO
Manning, Maxwell & Moore, Inc., 11 Elias St., Bridgeport, Conn.—YC
Marma Electronic Co., 703 Willow St., Chicago 14, Ill.—YE
Maryland Electronic Mfg. Corp., 5009 Calbert Rd., College Park, Md.—YP
Massa Laboratories, 3868 Carnegie Ave., Cleveland 15, Ohio—YL
Maxson Corp., W. L., 460 W. 34th St., New York 1, N. Y.—YY, YI
Measurements Corp., Box 180, Boonton, N. J.—YK, YYE, YX, YR, YD, YS, YO, YF, YV, YE, YI, YU (See ad P. 70)
Melpar, Inc., 452 Swann Ave., Alexandria, Va.—YY, YI
Meters, Inc., 915 Westfield Blvd., Indianapolis 20, Ind.—YY, YH
Metropolitan Electronics & Instruments Co., 106 Fifth Ave., New York 11, N. Y.—YB, YD, YS, YO, YP, YV
Metzger & Son, F. F., 2600 N. 6th St., Philadelphia 33, Pa.—YY
Microwave Equipment Co., Greenbrook Rd., Caldwell, N. J.—YY, YI
Millen Mfg. Co., James, 150 Exchange St., Malden 48, Mass.—YP, YX, YQ
Modulation Products Co., 92 East End Ave., New York 28, N. Y.—YS, YN, YO, YP
Monarch Mfg. Co., 2014 N. Major Ave., Chicago 39, Ill.—YI

National Electronics Laboratories, 1713 Kalorama Rd., N. W., Washington 9, D. C.—YS, YO, YP, YF, YQ, YV
National Technical Laboratories, 820 Mission St., S. Pasadena, Calif.—YI
Neptune Electronics Co., 433 Broadway, New York 13, N. Y.—YO, YV
Norrman Laboratories, Ernst, Williams Bay, Wisc.—YQ
North American Instrument Co., 23 E. 26 St., New York 10, N. Y.—YY

Ohmite Mfg. Co., 4835 W. Flournoy St., Chicago 44, Ill.—YA
Owen Laboratories, 9130 Orion St., San Fernando, Calif.—YJ
Panoramic Radio Products, Inc., 10 S. 2nd Ave., Mt. Vernon, N. Y.—YN
Pentron Corp., 611 W. Division St., Chicago 10, Ill.—YC
Philamon Laboratories, 5717 Third Ave., Brooklyn 20, N. Y.—YQ
Pickering & Co., Oceanside, N. Y.—YN
Polarad Electronics Corp., 100 Metropolitan Ave., Brooklyn 11, N. Y.—YP, YF
Polytechnic Research & Development Co., 202 Tillary St., Brooklyn 1, N. Y.—YR, YS, YQ, YK, YYA, YYB
Precision Apparatus Co., 92-27 Horace Harding Blvd., Elmhurst, L. I., N. Y.—YP, YV, YK, YG, YH, YZ,
Precision Electronic, Inc., 641 Milwaukee Ave., Chicago 22, Ill.—YS, YV
Radex Corp., 2076 Elston Ave., Chicago 14, Ill.—YB, YO
Radioactive Products Inc., 3201 E. Woodbridge St., Detroit 7, Mich.—YP
Radio City Products Co., 152 W. 24th St., New York 1, N. Y.—YS, YO, YV
Radio Corp. of America, RCA-Victor Div., Camden, N. J.—YA, YN, YO, YP, YF, YT, YV
Radio Frequency Laboratories, Boonton, N. J.—YM, YY
Radiomarine Corp. of America, 75 Varick St., New York 13, N. Y.—YO, YP
Radio Sonic Corp., 186 Union Ave., New Rochelle, N. Y.—YO
Radio Specialty Mfg. Co., 2023 S. E. 6th Ave., Portland 14, Ore.—YI, YY
Radio Supply & Engineering Co., 85 Selden Ave., Detroit 1, Mich.—YP
Radio Transceiver Laboratories, 116-23 Jamaica Ave., Richmond Hill 18, N. Y.—YF
Rahm Instruments, Inc., 12 W. Broadway, New York 7, N. Y.—YC, YI
Raytheon Mfg. Co., 138 River St., Waltham, Mass.—YN, YO, YP
Reeves-Hoffman Corp., 321 Cherry St., Carlisle, Pa.—YQ
Reiner Electronics Co., 152 W. 25th St., New York 1, N. Y.—YR, YS, YN, YO, YP, YF, YV, YA
Rollin Co., 2070 N. Fair Oaks, Pasadena 3, Calif.—YS
Rubicon Co., Ridge Ave. & 35 St., Philadelphia 32, Pa.—YD
Schnitzer Instrument Co., 12031 Euclid Ave., Garden Grove, Calif.—YM
Scott, Inc., Herman Hosmer, 385 Putnam Ave., Cambridge 39, Mass.—YL, YY, YI, YC
Servo Corp. of America, New Hyde Park, N. Y.—YS, YO
Servomechanisms, Inc., Old Country & Glen Cove Rds., Mineola, N. Y.—YC
Shallcross Mfg. Co., Jackson Pusey Aves., Collingdale, Pa.—YA, YD, YO, YT (See ad P. 67)
Sierra Electronic Corp., P. O. Box 346, San Carlos, Calif.—YV
Silver Co., Inc., McMurdo, 1249 Main St., Hartford 3, Conn.—YI, YYC, YS, YK

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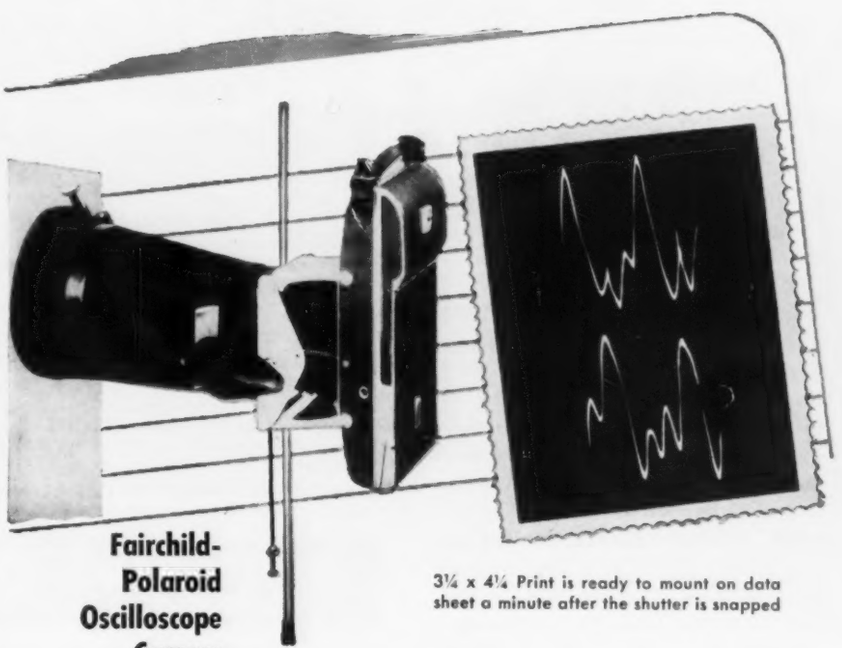

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3¼ x 4¼ Print is ready to mount on data sheet a minute after the shutter is snapped

Fairchild now offers an inexpensive oscilloscope camera that gives you accurate photographic records of waveshapes in almost as little time as it takes to sketch them from memory. Only one minute after the shutter is snapped, a print is ready to mount in your notebook. This permits you to evaluate oscilloscope "stills" immediately and then proceed with laboratory work.

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The complete Fairchild-Polaroid Oscilloscope Camera consists of a *scope adapter* to fit any five-inch oscilloscope, a *light-tight hood* with viewing port, and a *Polaroid-Land Camera body* with special lens and two-position shift device.

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Lens — Special 75 mm. f/2.8 Wollensak Oscillo-anastigmat.

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Picture Size — 3¼ x 4¼ in. (2 images per print; 16 exposures per roll of film).

Image Size — One-half reduction of scope image.

Writing Speed—to 1 in/μsec at 3000V accelerating potential; higher speeds at higher voltages.

Dimensions — Camera, 10½ x 5¼ x 6¼ in.; hood, 11 in. length, 7½ in. dia.; adapter, 2 in. width, 6⅝ in. max. dia.

Weight — Complete, 7¾ lb.

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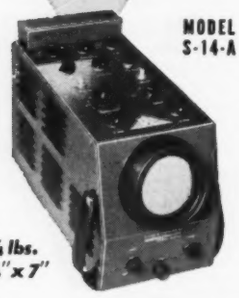
POCKETSCOPE
BY WATERMAN

MODEL
S-14-A



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SIGNAL GENERATOR
MODEL 202-D
Frequency Range 175-250 mc

The Type 202-D Signal Generator is a precise and reliable instrument well suited to the specialized requirements of telemetering engineers for rapidly analyzing and evaluating overall system performance.

SPECIFICATIONS

RF RANGE: 175-250 megacycles, accurate to ± 0.5%. Main frequency dial also calibrated in 24 equal divisions for use with vernier frequency dial.

FREQUENCY MODULATION (Deviation): FM deviation continuously variable from zero to 240 kc. Modulation meter calibrated in three FM ranges: 0-24 kc., 0-80 kc., and 0-240 kc.

AMPLITUDE MODULATION: Utilizing the internal audio oscillator amplitude modulation may be obtained over the range of 0-50%, with meter calibration points at 30% and 50%. By means of an external audio oscillator the RF carrier may be amplitude modulated to substantially 100%.

RF OUTPUT VOLTAGE: The RF output voltage is continuously variable from 0.1 microvolt to 0.2 volt at the terminals of the output cable; Output impedance at front panel jack is 53 ohms resistive.

DISTORTION: The overall FM distortion at 75 kc. deviation is less than 2% and at 240 kc. less than 10%. The AM distortion at 50% is less than 6.5%.

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BOONTON, N. J.

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LOGARITHMIC ATTENUATOR
THERMOSTATICALLY CONTROLLED
50 DB RANGE

ACCURATE STABLE

Output voltage is the logarithm of input voltage

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Solar Mfg. Corp., 1445 Hudson Blvd., N. Bergen, N. J. —YYC
Sound Apparatus Co., Stirling, N. J.—YL
Southwestern Industrial Electronic Co., 2831 Post Oak Road, Houston 19, Texas—YB, YD, YO, YV
Special Products Co., 9115 Brookville Rd., Silver Spring, Md.—YS
Spectrum Engineers, 540 N. 63 St., Philadelphia 31, Pa.—YY
Spencer-Kennedy Laboratories, 186 Mass. Ave., Cambridge 39, Mass.—YC
Sperry Gyroscope Co., Div. Sperry Corp., Great Neck, L. I., N. Y.—YR, YB, YS, YF, YT, YQ
Standard Electronic Research Corp., 2 East End Ave., New York 21, N. Y.—YY
Sticht Co., Herman H., 27 Park Place, New York, N. Y.—YH, YD, YV
Stoddart Aircraft Radio Co., 6644 Santa Monica Blvd., Hollywood 38, Calif.—YR, YF, YY
Superior Instrument Co., 227 Fulton St., New York, N. Y.—YS
Supreme, Inc., Greenwood, Miss.—YH
Sylvania Electric Products Co., 1740 Broadway, New York 19, N. Y.—YS, YO, YP, YV

Tech Laboratories, Inc., Bergen & Edsall Blvds., Palisades Park, N. J.— YA, YR, YD, YT
Technology Instrument Corp., 1058 Main St., Waltham 54, Mass.—YB, YS, YE, YI
Tektronix Inc., 712 S. E. Hawthorne Blvd., Portland 14, Ore.—YS, YP, YC, YYD
Telectro Industries Corp., 35-16 37th St., Long Island City 1, N. Y.—YA, YR, YB, YD, YS, YO, YP, YF, YT, YV
Telemark, Inc., 100 Greyrock Pl., Stamford, Conn.—YF
Teletronics Laboratory, 352 Maple Ave., Westbury, L. I., N. Y.—YY
Television Equipment Corp., 238 William St., New York 7, N. Y.—YS, YP
Television Projects, 3660 Coral Way, Miami 35, Florida —YK, YS
Tel-Instrument Co., 50 Paterson Ave., E. Rutherford, N. J.—YS, YYE
Testing Instruments, Inc., 120 W. 2nd St., Dayton 2, Ohio—YI
Trac Tape Recording Apparatus Co., Box 221, Caldwell, N. J.—YI
Trans-Sonics, Inc., Bedford Airport, Bedford, Mass.—YC
Transvision, Inc., New Rochelle, N. Y.—YF, YK
Trio Mfg. Co., Griggsville, Ill.—YF
Triplett Electrical Instrument Co., Bluffton, Ohio—YG, YS, YP, YK, YH

University Loudspeakers, Inc., 80 S. Kensico Ave., White Plains, N. Y.—YB

VFB Line Corp., Box 6789, Towson 4, Md.—YB
Vickers Inc., 1815 Locust St., St. Louis 3, Mo.—YC

Walkirt Co., 5808 Marilyn Ave., Culver City, Calif.— —YC, YY
Waterman Products Co., 2445-63 Emerald St., Philadelphia 25, Pa.—YS, YO, YP (See ad P. 70)
Weinschel Engineering Co., 123 Williams St., New York 7, N. Y.—YR, YS, YO, YI, YY
Western Electro-Acoustic Lab., 204 S. Beverly Dr., Beverly Hills, Calif.—YL, YV, YI, YY
Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark 5, N. J.—YI, YZ, YH, YL, YQ, YV, YG
Weston Laboratories, 410 Glen Rd., Weston 93, Mass.— YV, YO
Winslow Co., 9 Liberty St., Newark 5, N. J.—YB, YD, YM

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Meters ..... **ZM**
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RF Power meters ..... **ZZ**
Meter repair service ..... **ZB**
Miscellaneous ..... **ZV**

Aero Instrument Co., 110 W. Alameda, Burbank, Calif. —ZM, ZF
Aerolux Light Corp., 653 11th Ave., New York 19, N. Y.—ZV
American Electroneering Co., 2112 S. LaBrea, Los Angeles 16, Calif.—ZF
Amplifier Corp. of America, 398 Broadway, New York 13, N. Y.—ZI
Andrew Corp., 363 E. 75th St., Chicago 19, Ill.—ZA, ZR, ZZ
Assembly Products Co., Chagrin Falls, Ohio—ZM

Barker & Williamson, Inc., 237 Fairfield Ave., Upper Darby, Pa.—ZF
Beede Electrical Instrument Co., Penacook, N. H.—ZM
Berkeley Scientific Co., Sixth & Nevin Aves., Richmond, Calif.—ZF
Biddle Co., James G., 1316 Arch St., Philadelphia 7, Pa.—ZF
Bird Electronic Corp., 1800 E. 38th St., Cleveland 14, Ohio—ZR, ZZ
Browning Laboratories, Inc., 750 Main St., Winchester, Mass.—ZF
Brown Instrument Div., Minneapolis-Honeywell Regulator Co., Wayne & Roberts Aves., Philadelphia 44, Pa. —ZV
Burlington Instrument Co., Burlington, Iowa—ZM

Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—ZI
Cole Instrument Co., 1320 S. Grand Ave., Los Angeles 15, Calif.—ZA, ZI, ZM, ZV
Communications Company, 300 Greco Ave., Coral Gables, Fla.—ZM, ZZ

Daven Co., 191 Central Ave., Newark 4, N. J.—ZI, ZM, ZF, ZV
Doolittle Radio, Inc., 7421 S. Loomis Blvd., Chicago 36, Ill.—ZM

Electric Design & Mfg. Corp., P. O. Box 237, Burlington, Iowa—ZM
Electrix Corp., 150 Middle St., Pawtucket, R. I.—ZF
Electronic Measurements Co., Box 850, Red Bank, N. J. —ZF
Electronic Research & Mfg. Corp., 1420 E. 25 St., Cleveland 14, Ohio—ZF
Electro Sales Co., Inc., 399 Atlantic Ave., Boston 10, Mass.—ZM, ZF
Electro-Tech Equipment Co., 117 Lafayette St., New York 13, N. Y.—ZA, ZI, ZM, ZF, ZV

Fairchild Recording Equipment Corp., 154 St. and 7th Ave., Whitestone, N. Y.—ZI
Feiler Engineering Co., 945 W. George St., Chicago 14, Ill.—ZV
Field Electrical Instrument Co., 109 E. 184 St., New York 53, N. Y.—ZR, ZZ
Fluke Engineering Co., John, P. O. Box 755, Springdale, Conn.—ZV
Furst Electronics, 12 S. Jefferson St., Chicago 6, Ill. —ZF, ZV

Gates Radio Co., Quincy, Ill.—ZA, ZI, ZM, ZF, ZV
General Electric Co., Apparatus Dept., Schenectady 5, N. Y.—ZA, ZI, ZM, ZF, ZV, ZZ, ZR
General Radio Co., 275 Mass. Ave., Cambridge 39, Mass.—ZF
Gertsch Products, Inc., 11846 Mississippi Ave., Los Angeles 25, Calif.—ZF

Hart & Co., Inc., Frederick, 837 Main St., Poughkeepsie, N. Y.—ZI, ZM
Hewlett-Packard Co., 395 Page Mill Road, Palo Alto, Calif.—ZF, ZZ
Hickok Electrical Instrument Co., 10514 Dupont Ave., Cleveland 8, Ohio—ZM
Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—ZA, ZI, ZF, ZV
Industrial Devices, Inc., 22 State Road, Edgewater, N. J. —ZM, ZV
International Instruments Inc., 331 East Street, New Haven 11, Conn.—ZM, ZA, ZI, ZF, ZV
Ionic Equipment Co., 1705 N. Kenmore, Los Angeles 27, Calif.—ZV

J-B-T Instruments, Inc., 441 Chapel St., New Haven, Conn.—ZM, ZV
Jones Electronics Co., M. C., 96 N. Main St., Bristol, Conn.—ZM, ZZ

Lampkin Laboratories, Inc., Bradenton, Fla.—ZF
Link Radio Corp., 125 W. 17 St., New York 11, N. Y. —ZF

Magnetic Recorders Co., 7120 Melrose Ave., Los Angeles 46, Calif.—ZI, ZM, ZF, ZV
Marion Electrical Instrument Co., 400 Canal St., Manchester, N. H.—ZI, ZM
Maritime Switchboard Co., 336 Canal St., New York, N. Y.—ZM (See ad P. 84)
Meters, Inc., 915 Westfield Blvd., Indianapolis 20, Ind. —ZI, ZM, ZV
Metropolitan Electronics & Instruments Co., 106 Fifth Ave., New York 11, N. Y.—ZM, ZF
Microwave Equipment Co., Greenbrook Rd., Caldwell, N. J.—ZF

National Electronics Laboratories, 1713 Kalorama Rd., N. W., Washington 9, D. C.—ZF
Nebel Laboratory, R. E., 1104 Lincoln Pl., Brooklyn 13, N. Y.—ZV
Neptune Electronics Co., 433 Broadway, New York 13, N. Y.—ZV
Nilsson Electrical Laboratory, 103 Lafayette St., New York 13, N. Y.—ZB

Polytechnic Research & Development Co., 202 Tillary St., Brooklyn 1, N. Y.—ZF, ZZ
Precision Apparatus Co., 92-27 Horace Harding Blvd., Elmhurst, L. I., N. Y.—ZM, ZV
Pyramid Instrument Corp., 49 Howard St., New York 13, N. Y.—ZM, ZV

Radioactive Products Inc., 3201 E. Woodbridge St., Detroit 7, Mich.—ZF
Radio City Products Co., 152 W. 25th St., New York 1, N. Y.—ZA, ZI, ZM, ZV
Radio Corp. of America, RCA-Victor Div., Camden, N. J. —ZA, ZI, ZM, ZF, ZV
Radio Frequency Laboratories, Boonton, N. J.—ZV
Rawson Electrical Instrument Co., 117 Potter St., Cambridge 42, Mass.—ZR

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Reeder & Co., Charles, M., 171 Victor Ave., Detroit 3, Mich.—ZR
Reeves-Hoffman Corp., 321 Cherry St., Carlisle, Pa.—ZF
Reiner Electronics Co., 152 W. 25th St., New York 1, N. Y.—ZA, ZI, ZM, ZF, ZV
Roller-Smith Co., Bethlehem, Pa.—ZA, ZI, ZM

Sierra Electronic Corp., P. O. Box 346, San Carlos, Calif.—ZF
Silver Co., McMurdo, 1249 Main St., Hartford 3, Conn.—ZF
Simpson Electric Co., 5200 W. Kinzie St., Chicago 44, Ill.—ZM, ZA, ZI, ZF, ZV
Sperry Gyroscope Co., Div. Sperry Corp., Great Neck, L. I., N. Y.—ZF
Stancil-Hoffman Corp., 1016 N. Highland Ave., Hollywood 38, Calif.—ZI
Star Measurements Co., 442 E. 166th St., New York 56, N. Y.—ZM, ZV
Stevens Mfg. Co., Mansfield, Ohio—ZR

Tech Laboratories, Inc., Bergen & Edsall Blvds., Palisades Park, N. J.—ZI
Telectro Industries Corp., 35-16 37th St., Long Island City 1, N. Y.—ZF, ZV
Telemark, Inc., 100 Greyrock Pl., Stamford, Conn.—ZV
Triplett Electrical Instrument Co., Bluffton, Ohio—ZI, ZM, ZF

Westinghouse Electric Corp., Construction & Communications Sec. 10-L, E., Pittsburgh, Pa.—ZA, ZI, ZM, ZF, ZV
Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark 5, N. J.—ZA, ZI, ZM, ZF, ZR, ZZ
Weymouth Instrument Co., 1440 Commercial St., E. Weymouth 89, Mass.—ZF
Winslow Co., 9 Liberty St., Newark 5, N. J.—ZV, ZB

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Relays, antenna ..... **UUR**
Relays, audio control ..... **UUA**
Relays, power ..... **UUP**
Resistors, power type ..... **UUG**
Transformers ..... **UUT**

Accurate Engineering Co., 2005 Blue Island Ave., Chicago 8, Ill.—UUM, UUT
Acme Electric Corp., 31 Water St., Cuba, N. Y.—UUT, UUI
Acro Products Co., 5328 Baltimore Ave., Philadelphia 43, Pa.—UUT
Acro Transformer & Mfg. Co., 21-20 33rd Ave., Long Island City, N. Y.—UUT, UUI
Adams & Westlake Co., 1000 N. Michigan Ave., Elkhart, Ind.—UUP—(See ad 2nd Cover)
Advance Electric & Relay Co., 1260 W. 2nd St., Los Angeles 26, Calif.—UUR, UUA, UUP
Aerovox Corp., New Bedford, Mass.—UUX, UUG
Allen-Bradley Co., 138 W. Greenfield Ave., Milwaukee 4, Wisc.—UUA, UUP
Allied Control Co., 2 East End Ave., New York 21, N. Y.—UUP, UUA, UUR
Allied Radio Corp., 833 W. Jackson Blvd., Chicago, Ill.—UUP
American Condenser Co., 4410 N. Ravenswood Ave., Chicago 40, Ill.—UUX
American Gas Accumulator Co., 1029 Newark Ave., Elizabeth 3, N. J.—UUP
American Phenolic Corp., 1830 So. 54th Ave., Chicago 50, Ill.—UUB
American Relay & Controls, 4900 W. Flournoy St., Chicago 44, Ill.—UUP
American Television & Radio Co., 300 E. 4th St., St. Paul 1, Minn.—UUM
American Transformer Co., 178 Emmet St., Newark 5, N. J.—UUT
American Ventilating Hose Co., 15 Park Row, New York 7, N. Y.—UUU
Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.—UUB
Andrew Corp., 363 E. 75th St., Chicago 19, Ill.—UUB, UUR
Atlas Resistor Co., 423 Broome St., New York 13, N. Y.—UUG
Audio Development Co., 2833 13th Ave. S., Minneapolis 7, Minn.—UUT, UUI
Autocall Co., Shelby, Ohio—UUA
Automatic Electric Sales, 1033 W. Van Buren St., Chicago 7, Ill.—UUA, UUP (See ad P. 73)

Bendix Radio Div., Bendix Aviation Corp., Baltimore 4, Md.—UUT
Bird Electronic Corp., 1800 E. 38th St., Cleveland 14, Ohio—UUB
Booth Co., Arthur E., 4124 Beverly Blvd., Los Angeles 4, Calif.—UUP
Bud Radio, Inc., 2118 E. 55 St., Cleveland 3, Ohio—UUX
Burnell & Co., 45 Warburton Ave., Yonkers, N. Y.—UUC, UUE
Bunnell & Co., J. H., 81 Prospect St., Brooklyn 1, N. Y.—UUA, UUC

Carter Parts Co., 213 Institute Pl., Chicago 10, Ill.—UUG
Centralab Div., Globe-Union Inc., 900 E. Keefe Ave., Milwaukee 1, Wisc.—UUC
Chicago Transformer, 3501 Addison St., Chicago 18, Ill.—UUT
Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—UUT
Clare & Co., C. P., 4719 Sunnyside Ave., Chicago 30, Ill.—UUR, UUA, UUP
Clarostat Mfg. Co., Washington St., Dover, N. H.—UUG (See ad P. 82)
Clark Electronic Laboratories, Box 165, Palm Springs, Calif.—UUM
Coil Winders, Inc., 61 Bergen St., Brooklyn 2, N. Y.—UUT, UUI, UUC
Coleman Cable & Wire Corp., 4515 W. Addison St., Chicago 41, Ill.—UUB
Columbus Process Co., State & Maple Sts., Columbus Ind.—UUT
Communication Accessories Co., Hickman Mills, Mo.—UUT, UUI, UUC
Conant Electrical Laboratories, 6500 O St., Lincoln, Nebr.—UUM
Condenser Products Co., 1375 N. North Branch, Chicago, Ill.—UUX
Cook Electric Co., 2700 Southport Ave., Chicago 14, Ill.—UUA, UUP
Cornell-Dubilier Electric Corp., 1006 Hamilton Blvd., S. Plainfield, N. J.—UUX
Crest Transformer Corp., 1834 W. North Ave., Chicago 22, Ill.—UUT, UUI
Croname, Inc., 3701 N. Ravenswood Ave., Chicago 30, Ill.—UUG
Cutler Hammer, Inc., 315 N. 12 St., Milwaukee 1, Wisc. UUP

Dietz Design & Mfg. Co., 5810 Park St., Kansas City 4, Mo.—UUC
Dinion Coil Co., P. O. Box D, Caledonia, N. Y.—UUT
Dongan Electric Mfg. Co., 2987 Franklin St., Detroit 7, Mich.—UUT
Drake Co., R. L., 11 Longworth St., Dayton 2, Ohio—UUE
Dumont Electric Co., 309 Dyckman St., New York 34, N. Y.—UUX
Durakool, Inc., 1010 N. Main St., Elkhart, Ind.—UUP

Ebert Electronics Corp., 185-09 Jamaica Ave., Hollis 7, N. Y.—UUP
Edison Inc., Thomas A., 74 Lakeside Ave., W. Orange, N. J.—UUP
Eitel-McCullough, Inc., San Bruno, Calif.—UUX
Electrical Reactance Corp., 34 Elm St., Franklinville, N. Y.—UUI, UUG (See ad P. 3)
Electrical Windings, Inc., 2015 N. Kolmar Ave., Chicago 39, Ill.—UUT, UUI
Electro-Motive Mfg. Co., S. Park & John Sts., Willimantic, Conn.—UUX (See ad 3rd Cover)
Electricoil Transformer Co., 417 Canal St., New York, N. Y.—UUT, UUM
Electronic Apparatus Co., 116 E. Jackson Blvd., Elkhart, Ind.—UUP
Electronic Indicator Corp., 53 Wyckoff St., Brooklyn 2, N. Y.—UUG
Electronic Transformer Co., 207 W. 25th St., New York 1, N. Y.—UUT, UUI, UUC
Electro Sales Co., Inc., 399 Atlantic Ave., Boston 10, Mass.—UUR, UUA, UUP, UUM, UUT
Electro-Tech Equipment Co., 117 Lafayette St., New York 13, N. Y.—UUP, UUM, UUT
El-Rad Mfg. Co., 4087 Broadway, Chicago 13, Ill.—UUR, UUA, UUP, UUT, UUI, UUC
Essex Electronics, Springfield Ave., Berkeley Hts., N. J.—UUT
Etraco Mfg. Co., Woods Church Rd., Flemington, N. J.—UUT
Fast & Co., John E., 3123 N. Pulaski Rd., Chicago 41, Ill.—UUX
Federal Telephone & Radio Corp., 100 Kingsland Rd., Clifton, N. J.—UUM, UUB (See ad P. 49)
Ferranti Electric Inc., 30 Rockefeller Plaza, New York 20, N. Y.—UUT, UUI
Filtron Co., 38-25 Bell Blvd., Bayside, L. I., N. Y.—UUE
Flexible Tubing Corp., N. Main St., Branford, Conn.—UUU
Forest Electric Co., 7216 Circle Ave., Forest Park, Ill.—UUT
Foster Transformer Co., 3820 Colerain Ave., Cincinnati 23, Ohio—UUT
Freed Transformer Co., 1718-36 Weirfield St., Brooklyn 27, N. Y.—UUT

Gates Radio Co., Quincy, Ill.—UUR, UUA, UUP, UUM, UUT, UUI, UUC
Gardner Electric Mfg. Co., 4227 Hollis St., Emeryville, Calif.—UUT
Gaveco Laboratories, Inc., 2 East End Ave., New York 21, N. Y.—UUT, UUI
General Cable Corp., 420 Lexington Ave., New York 17, N. Y.—UUB
General Communications Co., 530 Commonwealth Ave., Boston 15, Mass.—UUB
General Electric Co., Apparatus Dept., Schenectady 5, N. Y.—UUR, UUA, UUP, UUM, UUT, UUI, UUC, UUG, UUE, UUF (See ad P. 56)
General Radio Co., 275 Mass. Ave., Cambridge 39, Mass.—UUB
General Transformer Corp., 4321 N. Knox Ave., Chicago 41, Ill.—UUT
Gilandun Electronics, RT 1, Box 489, Cupertino, Calif.—UUX
Goslin Electric & Mfg. Co., 2921 W. Olive Ave., Burbank, Calif.—UUT
Gramer Co., 2734 N. Pulaski Rd., Chicago 39, Ill.—UUT, UUI
Green Electric Co., W., 130 Cedar St., New York 6, N. Y.—UUM
Guardian Electric Mfg. Co., 1621 W. Walnut St., Chicago 12, Ill.—UUR, UUP, UUF (See ad P. 85)

Haldorson Co., 4500 Ravenswood Ave., Chicago 40, Ill.—UUT, UUI
Hardwick, Hindle, Inc., 40 Hermon St., Newark 5, N. J.—UUG
Harvey Radio Labs., 447 Concord Ave., Cambridge, Mass.—UUT
Heinemann Electric Co., P. O. Box 299, Trenton 2, N. J.—UUF, UUP (See ad P. 41)
Helipot Corp., 1011 Mission St., S. Pasadena, Calif.—UUT
Highland Engineering Co., 32 Holman Blvd., Hicksville, L. I., N. Y.—UUT, UUI
Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—UUI, UUC
Horlick Co., Wm. I., 407 Atlantic Ave., Boston 10, Mass.—UUT

Industrial Condenser Corp., 3243 N. California Ave., Chicago 18, Ill.—UUX
Industrial Transformer Corp., Gouldsboro, Pa.—UUT, UUI, UUC
International Rectifier Corp., 6809 S. Victoria Ave., Los Angeles 43, Calif.—UUM
International Resistance Co., 401 N. Broad St., Philadelphia 8, Pa.—UUG
I-T-E Circuit Breaker Co., 19th & Hamilton Sts., Philadelphia 30, Pa.—UUF

Jefferson Electric Co., 900 25th Ave., Bellwood, Ill.—UUT
Jefferies Transformer Co., 1710 E. 57 St., Los Angeles, Calif.—UUT
Jennings Radio Mfg. Co., 1098 E. William St., San Jose 12, Calif.—UUX
Johnson Co., E. F., Waseca, Minn.—UUR, UUC
Joy Mfg. Co., Mines Equip. Div., 4235 Clayton Ave., St. Louis 10, Mo.—UUD

Kenyon Transformer Co., 840 Barry St., New York 59, N. Y.—UUT
Kurman Electric Co., 35-18 37 St., Long Island City 1, N. Y.—UUA, UUR
K-V Transformer Corp., 4412 Park Ave., New York 57, N. Y.—UUT, UUI, UUC
Kyle Corp., S. Milwaukee, Wisc.—UUT
Langevin Mfg. Corp., 37 W. 65th St., New York 23, N. Y.—UUT, UUI, UUC
Leach Relay Co., 5915 Avalon Blvd., Los Angeles 3, Calif.—UUR, UUP, UUA
Lectrohm, Inc., 5939 Archer Ave., Chicago 38, Ill.—UUG
Lee Electric & Mfg. Co., 2806 Clearwater St., Los Angeles 26, Calif.—UUM, UUT, UUI
Leland, Inc., G. H., 160 Webster St., Dayton 2, Ohio—UUA, UUP, UUR
Lenkert Electric Co., San Carlos, Calif.—UUI
Lenz Electric Mfg. Co., 1751 N. Western Ave., Chicago 47, Ill.—UUD
Link Radio Corp., 125 W. 17 St., New York 11, N. Y.—UUR, UUA, UUP, UUM, UUT, UUC

McColpin-Christie Corp., 4922 S. Figueroa St., Los Angeles 37, Calif.—UUM
Magnetic Devices, Inc., P. O. Box 141, Frederick, Md.—UUA
Mallory & Co., P. R., 3029 E. Washington St., Indianapolis 6, Ind.—UUX, UUM, UUG
Meissner Mfg. Co., 936 N. Michigan Ave., Chicago, Ill.—UUX
Mepco, Inc., 37 Abbett Ave., Morristown, N. J.—UUG
Melco Products Inc., 22 E. Hennepin Ave., Minneapolis 1, Minn.—UUT
Merit Transformer Corp., 4427 N. Clark St., Chicago 40, Ill.—UUT
Micamold Products Corp., 1087 Flushing Ave., Brooklyn, N. Y.—UUX, UUG
Midwest Automatic Control Co., 510 Third St., Des Moines 9, Iowa—UUD
Mid-West Coil & Transformer Co., 1642 N. Halsted St., Chicago 14, Ill.—UUT
Millen Mfg. Co., James, 150 Exchange St., Malden 48, Mass.—UUC
Miller Co., B. F., P. O. Box 568, Trenton, N. J.—UUT, UUI
Model Eng'g & Mfg. Co., 237 E. Park Dr., Huntington, Ind.—UUG
Model Rectifier Corp., 1510 Nostrand Ave., Brooklyn 26, N. Y.—UUM
Monarch Mfg. Co., 2014 N. Major Ave., Chicago 39, Ill.—UUI
Muter Co., 1255 S. Michigan Ave., Chicago 5, Ill.—UUG

Nazareth Transformer Corp., 12 North St., Danbury, Conn.—UUT
New York Transformer Co., Third Ave., Alpha, N. J.—UUT
Nothelfer Winding Lab., 118 Albemarle Ave., Trenton, N. J.—UUT

Oak Mfg. Co., 1260 Clybourn Ave., Chicago, Ill.—UUP
Ohio Carbon Co., 12508 Berea Rd., Cleveland 11, Ohio—UUG
Ohmite Mfg. Co., 4835 W. Flournoy St., Chicago 44, Ill. UUG
Osborne Transformer Corp., 948 E. Lafayette Ave., Detroit 7, Mich.—UUT
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In addition to these low-capacitance characteristics, Automatic Electric video relays provide the dependability of "twin" contacts and the small size you need for compact mounting. The Class "C" video relay (background above) is especially suitable for strip mounting; it is only 0.687″ wide and 2⅛″ high and is 5 15/32″ in overall length. The Class "S" relay (two views in foreground) is 1″ wide, 1⅜″ high and 1 19/32″ long, overall. Operating mechanisms are basically standard Automatic Electric designs, thus assuring the high operating efficiency for which Automatic Electric controls are famous.

To receive complete information, simply let us know your specific needs. Address AUTOMATIC ELECTRIC SALES CORPORATION, Chicago 7, Ill. In Canada: Automatic Electric (Canada) Ltd., Toronto.

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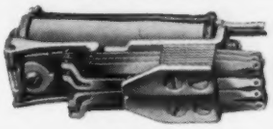
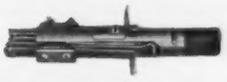
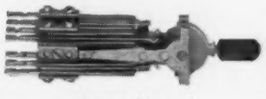


Relays



Turn Keys



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Peerless Electrical Products, 6920 McKinley Ave., Los Angeles 1, Calif.—UUT
Philco Corp., C & Tioga Sts., Philadelphia 34, Pa.—UUG
Phillips Control Corp., 84 W. Jefferson St., Joliet, Ill.—UUR, UUA, UUP
Planet Mfg. Corp., 225 Belleville Ave., Bloomfield, N. J.—UUX
Potter & Brumfield, Princeton, Ind.—UUR, UUA, UUP
Precision Resistor Co., 334 Badger Ave., Newark 8, N. J. UUG
Price Electric Co., Frederick Md.—UUR, UUA, UUP
Pyramid Electric Co., 155 Oxford St., Paterson 2, N. J.—UUX
Radio Components Inc., 28 N. Halsted St., Chicago 6, Ill.—UUG
Radio Corp. of America, RCA-Victor Div., Camden, N. J.—UUA, UUC
Radio Receptor Co., 84 N. 9th St., Brooklyn 11, N. Y.—UUM
Ram Electronics Inc., S. Buckhout St., Irvington, N. Y.—UUT
Raytheon Mfg. Co., 138 River St., Waltham, Mass.—UUM, UUT
RBM Mfg. Co., Div. Essex Wire Corp., Logansport, Ind.—UUP
Rectifier Engineering Co., 1803 E. 7th St., Los Angeles 21, Calif.—UUM
Reeves Soundcraft Corp., 35-54 36th St., Long Island City 6, N. Y.—UUT
Sangamo Electric Co., Springfield, Ill.—UUX
Sarkes-Tarzian, Inc., Bloomington, Ind.—UUM
Schuttig & Co., 9th & Kearny Sts., N. E., Washington 17, D. C.—UUR
Sickles Co., F. W., 165 Front St., Chicopee, Mass.—UUC
Sigma Instruments, Inc., 70 Ceylon St., Boston, Mass.—UUA
Silver Co., McMurdo, 1249 Main St., Hartford 3, Conn.—UUC
Simpson Electric Co., 5208 W. Kinzie St., Chicago 44, Ill.—UUP
SNC Mfg. Co., P. O. Box 277, Oshkosh, Wisc.—UUT
Solar Mfg. Corp., 1445 Hudson Blvd., N. Bergen, N. J. UUX
Sorenson & Co., 375 Fairfield Ave., Stamford, Conn.—UUI,
Southwestern Industrial Electronic Co., 2831 Post Oak Road, Houston 19, Texas—UUT, UUI
Sperry Products Inc., Shelter Rock Rd., Danbury, Conn.—UUT
Sprague Electric Co., North Adams, Mass.—UUX, UUG (See ad P. 12)
Stackpole Carbon Co., St. Marys 3, Pa.—UUG
Standard Arcturus Corp., Kotron Div., 54 Clark Street, Newark 4, N. J.—UUM
Standard Electrical Products Co., 408 Linden Ave., Dayton 3, Ohio—UUI, UUT
Standard Transformer Corp., Elston, Kedzie & Addison Sts., Chicago 18, Ill.—UUT, UUI
Stevens-Arnold Co., 22 Elkins St., S. Boston 27, Mass.—UUA
Stolle Engineering & Mfg. Co., 3970 S. Grand Ave., Los Angeles Calif.—UUT
Stromberg-Carlson Co., 110 Carlson Rd., Rochester 3, N. Y.—UUA
Struthers-Dunn, Inc., 150 N. 13th St., Philadelphia 7, Pa.—UUR, UUA, UUP, UUF
Super Electric Products Corp., 1057 Summit Ave., Jersey City, N. J.—UUT
Telectro Industries Corp., 35-16 37th St., Long Island City 1, N. Y.—UUR, UUA, UUP, UUT, UUC
Telex, Inc., Telex Park, Minneapolis 1, Minn.—UUG
Thermador Electrical Mfg. Co., 5119 S. District Blvd., Los Angeles 22, Calif.—UUT
Thordarson Electric Mfg. Div., Maguire Industries, Inc., 500 W. Huron St., Chicago 10, Ill.—UUT, UUI
Titeflex, Inc., 500 Frelinghuysen Ave., Newark 5, N. J.—UUU
Torocoil Co., 5387 Northland Ave., St. Louis 12, Mo.—UUC
Transradio Ltd., 138 A. Cromwell Rd., London S. W. 7, England—UUB
Triad Transformer Mfg. Co., 2254 Sepulveda Blvd., Los Angeles 4, Calif.—UUT, UUI
United Electronics Co., 42 Spring St., Newark 2, N. J. UUX
United Transformers Corp., 150 Varick St., New York 13, N. Y.—UUT, UUI, UUC
University Loudspeakers, Inc., 80 S. Kensico Ave., White Plains, N. Y.—UUT
Varo Mfg. Co., Box 638, Garland, Tex.—UUA, UUP
Ward Leonard Electric Co., Mt. Vernon, N. Y.—UUA, UUP, UUR, UUG
Weinschel Engineering Co., 123 William St., New York 7, N. Y.—UUB
Westinghouse Electric Corp., Construction & Communications sec 10-L, E. Pittsburgh, Pa.—UUP, UUM, UUT, UUI
Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark 5, N. J.—UUR, UUA, UUP
Wirt Co., 5221 Greene St., Philadelphia 44, Pa.—UUG

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28—*Armed Forces & Civilian Depts.*

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Accurate Engineering Co., 2005 Blue Island Ave., Chicago 8, Ill.—VVP
Air Associates, Inc., Teterboro, N. J.—VVC, VVT, VVP, VVE, VVN, VVA, VVO, VVW
Aircraft Radio Corp., Boonton, N. J.—VVC, VVT, VVE, VVA, VVG
Akeley Camera & Instrument Corp., 175 Varick St., New York 14, N. Y.—VVA, VVR
Allison Radar, Albuquerque, N. M.—VVR
American Communications Corp., 306 Broadway, New York 7, N. Y.—VVC, VVT, VVB, VVP, VVE, VVW, VVR
American Electroneering Co., 2112 S. La Brea, Los Angeles 16, Calif.—VVC, VVT, VVB, VVP, VVE, VVN, VVA, VVL, VVR
American Hydromath Co., 145 W. 57th St., New York 19, N. Y.—VVN, VVA, VVO, VVW
American Precision Dial Co., 314 Washington St., Newton, Mass.—VVH, VVL, VVR
American Television & Radio Co., 300 E. 4th St., St. Paul, Minn.—VVP
Amplifier Corp. of America, 398 Broadway, New York 13, N. Y.—VVP, VVE
Applied Science Corp., P. O. Box 44, Princeton, N. J.—VVT, VVN, VVW
ARF Products, Inc., 7627 Lake St., River Forest, Ill.—VVC, VVT, VVP, VVE, VVR
Arlington Electric Products, Inc., 500 W. 52nd St., New York 19, N. Y.—VVT, VVP, VVE, VVN, VVA, VVO, VVR
Atlas Sound Corp., 1449—39th St., Brooklyn 18, N. Y.—VVE
Bache & Co., Semon, 636 Greenwich St., New York 14, N. Y.—VVF
Barker & Williamson, Inc., 237 Fairfield Ave., Upper Darby, Pa.—VVT, VVE
Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N. Y.—VVF
Bendix Aviation Corp., Pacific Div., 11600 Sherman Way, N. Hollywood, Calif.—VVC, VVT, VVP, VVN, VVO, VVH, VVL, VVW, VVR, VVG
Bendix Aviation Corp., Red Bank Div., Red Bank, N. J. VVP
Beta Electric Corp., 1762 3rd Ave., New York 29, N. Y.—VVP
Boehme Inc., H. O., 915 Broadway, New York 10, N. Y.—VVE
Bomac Laboratories, Inc., 96 Park St., Beverly, Mass.—VVR
Booth Co., Arthur E., 4124 Beverly Blvd., Los Angeles 4, Calif.—VVP
Brelco Electronics Corp., 55 Vandam St., New York 13, N. Y.—VVE, VVN
Browning Laboratories, Inc., 750 Main St., Winchester, Mass.—VVL
Brush Development Co., 3405 Perkins Ave., Cleveland 14, Ohio—VVP, VVA
Bunnell & Co., J. H., 81 Prospect St., Brooklyn 1, N. Y.—VVC, VVT, VVB, VVP, VVE, VVN, VVA, VVO, VVL, VVR
Burke & James, Inc., 321 S. Wabash Ave., Chicago, Ill.—VVF
Caltron Products, 1406 S. Hobart Blvd., Los Angeles 6, Calif.—VVP, VVE
Canoga Corp., 14315 Bessemer St., Van Nuys, Calif.—VVR
Capehart-Farnsworth Corp., 3700 Pontiac St., Fort Wayne 1, Ind.—VVC, VVT, VVR
Cardwell Mfg. Corp., Allen D., 97 Whiting St., Plainville, Conn.—VVC, VVT, VVE, VVW
Carter Motor Co., 2644 N. Maplewood Ave., Chicago 47, Ill.—VVP
CGS Laboratories, 36 Ludlow St., Stamford, Conn.—VVE, VVO, VVR
Chatham Electronics Corp., 475 Washington St., Newark 2, N. J.—VVT, VVP, VVN, VVR
Clark Cooper Co., Palmyra, N. J.—VVN
Clarke Instrument Corp., 910 King St., Silver Spring, Md.—VVC
Collins Radio Co., 855-35th St., N. E., Cedar Rapids, Iowa—VVC, VVT, VVE, VVA
Columbus Electronics Corp., 229 S. Waverly St., Yonkers, N. Y.—VVG
Communication Devices Co., 2331 12th Ave., New York 27, N. Y.—VVC, VVT, VVB, VVP, VVE, VVN, VVA, VVO, VVL, VVR
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Control Instrument Co., 67 35 St., Brooklyn 32, N. Y.—VVN, VVA
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Electronic Associates, Inc., Long Branch, N. J.—VVT, VVP, VVR
Electronic Measurements Co., Box 850, Red Bank, N. J.—VVC, VVT, VVP, VVR
Electronic Transformer Co., 207 W. 25th St., New York 1, N. Y.—VVP
Electronics Research Inc., Diamond & Ky. Aves., Evansville 4, Ind.—VVG
Elizabeth Iron Works, P. O. Box 360, Elizabeth B, N. J.—VVR
Elm Laboratories, 18 S. Broadway, Dobbs Ferry, N. Y.—VVN, VVA, VVG
Eltron, Inc., 407 N. Jackson St., Jackson, Mich.—VVC, VVP, VVE, VVA, VVR
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Espey Mfg. Co., 528 E. 72nd St., New York 21, N. Y.—VVC, VVT, VVB, VVP, VVE, VVN, VVR
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Federal Telephone and Radio Corp., 100 Kingsland Rd., Clifton, N. J.—VVC, VVT, VVB, VVP, VVE, VVA, VVO, VVL, VVR
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French-Van Breems Inc., 405 Lexington Ave., New York 17, N. Y.—VVC, VVB, VVP, VVE, VVN, VVA, VVR
Furst Electronics, 12 S. Jefferson St., Chicago 6, Ill.—VVP
Gadgets, Inc., 3629 N. Dixie Dr., Dayton 5, Ohio—VVR
Gale Dorothea Mechanisms, 37-61 85 St., Jackson Heights, L. I., N. Y.—VVP
Gates Radio Co., Quincy, Ill.—VVC, VVT, VVB, VVP, VVE
Gaveco Laboratories, Inc., 2 East End Ave., New York 21, N. Y.—VVP
General Electric Co., Electronics Dept., Syracuse, N. Y.—VVC, VVT, VVB, VVP, VVE, VVN, VVA, VVL, VVR, VVG
Gilfillan Bros., 1815 Venice Blvd., Los Angeles 6, Calif.—VVR, VVG, VVA, VVT
Gorrell & Gorrell, Box 10, Haworth, N. J.—VVG
Gray Research & Development Co., 16 Arbor St., Hartford 1, Conn.—VVE, VVA, VVO, VVR
Gulton Mfg. Corp., Metuchen, N. J.—VVO
Hallicrafters Co., 4401 W. Fifth Ave., Chicago 24, Ill.—VVC, VVT
Hart & Co., Frederick, 837 Main St., Poughkeepsie, N. Y.—VVE
Harvey Radio Laboratories, 447 Concord Ave., Cambridge 38, Mass.—VVC, VVT, VVB, VVP, VVE, VVN, VVA, VVO, VVS, VVH, VVL, VVW, VVR
Hastings Instrument Co., Box 1275, Wythe Br., Hampton, Va.—VVN, VVA, VVD
Highland Engineering Co., 32 Holman Blvd., Hicksville, L. I., N. Y.—VVP, VVE
Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—VVC, VVT, VVB, VVP, VVE, VVN, VVA, VVO, VVH, VVL, VVW, VVR
Houston-Fearless Corp., W. Los Angeles 64, Calif.—VVR
Hudson American Corp., 25 W. 43rd St., New York 18, N. Y.—VVC, VVT, VVE
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Isolantite Mfg. Corp., Warren Ave., Stirling, N. J.—VVE, VVO
Jones Electronics Co., M. C., 96 N. Main St., Bristol, Conn.—VVE
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Kepco Laboratories, 149-14 41st Ave., Flushing, N. Y.—VVP

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Moulic Specialties Co., 1005 W. Washington St., Bloomington, Ill.—VVP

National Electronics Laboratories, Inc., 1713 Kalorama Rd., N. W. Washington 9, D. C.—VVC, VVT, VVP, VVE, VVA, VVR
Neptune Electronics Co., 433 Broadway, New York 13, N. Y.—VVP, VVE, VVN, VVA
Network Mfg. Corp., 213 W. 5th St., Bayonne, N. J.—VVP, VVW, VVR
North American Instrument Co., 23 E. 26 St., New York 10, N. Y.—VVO, VVR, VVG
NRK Mfg. & Eng'g Co., 5644 N. Western Ave., Chicago 45, Ill.—VVR

Oak Mfg. Co., 1260 Clybourn Ave., Chicago, Ill.—VVE, VVF
Oregon Electronics, 206 S. W. Washington St., Portland 4, Ore.—VVP
Orthon Corp., 196 Albion Ave., Paterson 2, N. J.—VVP

Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.—VVC, VVT, VVB, VVP, VVE, VVN, VVA, VVL, VVW, VVR
Polarad Electronics Corp., 100 Metropolitan Ave., Brooklyn 11, N. Y.—VVC, VVP, VVA, VVR
Polytechnic Research & Development Co., 202 Tillary St., Brooklyn 1, N. Y.—VVP
Precision Products, Inc., 719 17th St., N. W., Washington D. C.—VVF
Premax Products Div., Chisholm-Ryder Co., Highland & College Aves., Niagara Falls, N. Y.—VVE
Press Wireless Mfg. Co., Cantiague Rd., Hicksville, L. I., N. Y.—VVC, VVT, VVB, VVP, VVE, VVN, VVA, VVR
Presto Recording Corp., P. O. Box 500, Hackensack, N. J.—VVN, VVA, VVO, VVL, VVR
Projection Optics Co., 330 Lyell Ave., Rochester 6, N. Y. —VVF

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Radio Engineering Laboratories, Inc., 36-40 37th St., Long Island City 1, N. Y.—VVC, VVT, VVB, VVE, VVW, VVR
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Stancil-Hoffman Corp., 1016 N. Highland Ave., Hollywood 38, Calif.—VVP
Standard Electronic Research Corp., 2 East End Ave., New York 21, N. Y.—VVG
Star Measurements Co., 442 E. 166 St., New York 56, N. Y.—VVP, VVR
Superior Electric Co., 83 Laurel St., Bristol, Conn.—VVP
Taffet Radio & Television Co., 2530 Belmont Ave., New York 58, N. Y.—VVC, VVT, VVP, VVE, VVO, VVR
Tech Laboratories, Inc., Bergen & Edsall Blvds., Palisades Park, N. J.—VVP, VVE
Telectro Industries Corp., 35-16 37th St., Long Island City 1, N. Y.—VVC, VVT, VVB, VVP, VVE, VVN, VVA, VVO, VVS, VVH, VVL, VVW, VVR
Telemark, Inc., 100 Greyrock Pl., Stamford, Conn.—VVA, VVO, VVR, VVC, VVE, VVN
Television Equipment Corp., 238 William St., New York 7, N. Y.—VVP, VVN, VVA, VVL
Thordarson Electric Mfg. Div., Maguire Industries, Inc., 500 W. Huron St., Chicago 10, Ill.—VVT
Titeflex, Inc., 500 Frelinghuysen Ave., Newark 5, N. J. —VVN, VVA, VVR
Transmitter Equip. Mfg. Co., 345 Hudson St., New York 14, N. Y.—VVC, VVT, VVB, VVP, VVE, VVR
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Vacuum Tube Products, 302 N. Clementine St., Oceanside, Calif.—VVE
Varo Mfg. Co., Box 638, Garland, Tex.—VVP
Waters Conley Co., Rochester, Minn.—VVA
Webster Electric Co., Clark & DeKoven Aves., Racine, Wisc.—VVE
Western Sound & Electric Labs., 805 S. 5th St., Milwaukee, Wisc.—VVP, VVE
Westinghouse Electric Corp., Construction & Communications Sec. 10-L, E. Pittsburgh, Pa.—VVT, VVB, VVP, VVE, VVN, VVA, VVR
Wheeler Insulated Wire Co., 150 E. Aurora St., Waterbury 20, Conn.—VVE
Winslow Co., 9 Liberty St., Newark 5, N. J.—VVE
Workshop Associates, Inc., 66 Needham St., Newton Highlands 61, Mass.—VVE, VVA, VVR

29—Books & Data Services

Manuals, engineering ..... **RE**
Manuals, tube ..... **RT**
Manuals, test equipment ..... **RA**
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Gawler-Knoop, Inc., 1060 Broad St., Newark 2, N. J. —RA
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Rider Publisher Inc., John F., 404 Fourth Ave., New York 16, N. Y.—RE, RR
Sams & Co., Howard W., 2205 E. 46 St., Indianapolis 5, Ind.—RE, RR
Sylvania Electric Products Co., 1740 Broadway, New York 19, N. Y.—RT, RM
Technicraft Laboratories, Inc., Thomaston-Waterbury Rd., Thomaston, Conn.—RE, RR
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Van Nostrand Co., Inc., D., 250 Fourth Ave., New York, N. Y.—RM
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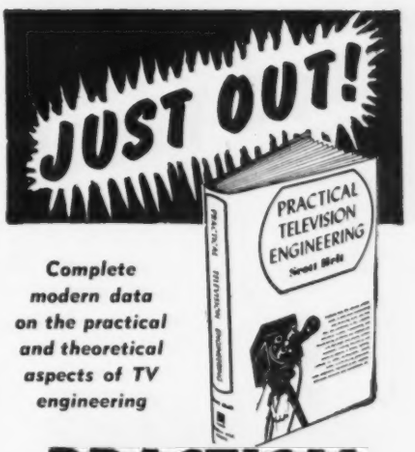
Ward Leonard Electric Co., Mount Vernon, N. Y.—RE, RR
Wiley & Sons, John, 440 Fourth Ave., New York 16, N. Y.—RE, RR



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Arc Radio Corp., 523 Myrtle Ave., Brooklyn 5, N. Y.—WWC

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DuMont Laboratories, Allen B., 1000 Main Ave., Clifton, N. J.—WWR, WWC

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Elizabeth Iron Works, P. O. Box 360, Elizabeth B, N. J.—WWS, WWD
Espey Mfg. Co., 528 E. 72nd St., New York 21, N. Y. —WWC

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Gates Radio Co., Quincy, Ill.—WWC, WWT, WWR, WWS, WWD, WWF
General Electric Co., Electronic Co., Electronics Dept., Syracuse, N. Y.—WWC, WWT, WWR, WWF
Grant Pulley & Hardware Co., 33-36 57th St., W., Woodside, N. Y.—WWC, WWR

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Haydon Products Corp., 1801 8th Ave., Brooklyn 15, N. Y.—WWC, WWR, WWS, WWD
Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—WWC

Johnson Co., E. F., Waseca, Minn.—WWR

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Lumenite Electronic Co., 407 S. Dearborn St., Chicago 5, Ill.—WWT

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Magnetic Recorders Co., 7120 Melrose Ave., Los Angeles 46, Calif.—WWC, WWT, WWR, WWS

Newcomb Audio Products Co., 6824 Lexington Ave., Hollywood 38, Calif.—WWR
Neumade Products Corp., 330 W. 42nd St., New York 18, N. Y.—WWC, WWR, WWS, WWD

Par-Metal Products Corp., 32-62—49 St., Long Island City 3, N. Y.—WWC, WWR
Radio Corp. of America, RCA-Victor Div., Camden, N. J. —WWC, WWR
Radio Engineering Laboratories, 36-40 37 St., Long Island City 1, N. Y.—WWR
Raytheon Mfg. Co., 138 River St., Waltham, Mass.—WWR

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Stancil-Hoffman Corp., 1016 N. Highland Ave., Hollywood 38, Calif.—WWC, WWR
Sticht Co., Herman H., 27 Park Pl., New York 7, N. Y.—WWT

United Wood Specialty Mfg. Co., 951 Broadway, Fall River, Mass.—WWC

Webb Mfg. Co., 4th & Cambria Sts., Philadelphia 33, Pa.—WWE
Wilcox Electric Co., 14th & Chestnut St., Kansas City, Mo.—WWC

31—Batteries

Dry ..... XXB
Dry, portable ..... XXD
Nickel-Alkaline ..... XXA
Storage, fixed ..... XXF
Storage, portable ..... XXP

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Bond Electric Corp., P. O. Drawer 906, New Haven 4, Conn.—XXD
Bowers Battery & Spark Plug Co., Box 1262, Reading, Pa.—XXF, XXP
Bright Star Battery Co., 200 Crooks Ave., Clifton, N. J. —XXB, XXD
Burgess Battery Co., Freeport, Ill.—XXB, XXD

Edison Storage Battery Div., P. O. Box 543, Orange, N. J.—XXF, XXP, XXA
Electric Storage & Battery Co., Allegheny Ave. & 19th St., Philadelphia 32, Pa.—XXF, XXP

Gates Radio Co., Quincy, Ill.—XXD
General Dry Batteries, Inc., 13000 Athens Ave., Cleveland 7, Ohio—XXB
General Electric Co., Electronics Dept., Syracuse, N. Y. —XXD, XXB

National Carbon Co., 30 E. 42nd St., New York 17, N. Y.—XXB
National Union Radio Corp., 350 Scotland Rd., Orange, N. J.—XXD
Nickel Cadmium Battery Corp., Easthampton, Mass.— XXF, XXP, XXA

Olin Industries, Inc., Winchester Ave., New Haven 4, Conn.—XXD

Radio Corp. of America, RCA-Victor Div., Camden, N. J. —XXB, XXD
Ray-O-Vac Co., 212 Washington St., Madison, Wisc.— XXB, XXD

Specialty Battery Co., 212 E. Washington Ave., Madison 3, Wisc.—XXD
Stancil-Hoffman Corp., 1016 N. Highland Ave., Hollywood 38, Calif.—XXP

Willard Storage Battery Co., 246 E. 131st St., Cleveland 1, Ohio.—XXD, XXF, XXP

Yardney Electric Corp., 105 Chambers St., New York 7, N. Y.—XXF, XXP

32—Special Film & Broadcasting Services

Construction ..... ZZC
Design, special audio ..... ZZG
Dubbing, sound ..... ZZB
Effects record, sound ..... ZZY
Equipment theater TV ..... ZZU
Kinescoping ..... ZZK
Laboratories, film processing ..... ZZF
Libraries, record ..... ZZL
Libraries, tape music ..... ZZW
Materials, special effects ..... ZZH
Production, film ..... ZZZ
Production, TV spot film ..... ZZA
Production, slides ..... ZZI
Production, transcriptions ..... ZZV
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Alexander Film Co., Alexander Film Bldg., Colorado Springs, Colo.—ZZF, ZZE, ZZS, ZZT, ZZA, ZZZ, ZZB, ZZJ
Allen & Allen Productions, 3947 W. 59 Pl., Los Angeles 43, Calif.—ZZE, ZZS, ZZT, ZZA, ZZB, ZZZ, ZZP, ZZJ
Andrew Corp., 363 E. 75th St., Chicago 19, Ill.—ZZC
Applied Science Corp., P. O. Box 44, Princeton, N. J.— ZZQ, ZZC
Associated Program Service, Div. Musak Corp., 151 W. 46 St., New York 19, N. Y.—ZZL
Audio-Master Co., 23 W. 45 St., New York 19, N. Y. —ZZL, ZZW, ZZY, ZZV
Austin Co., 16112 Euclid Ave., East Cleveland, Ohio— ZZC

Barrere, Claude, 70 E. 4th St., New York 17, N. Y.— ZZP

Basch Radio & TV Productions, 17 E. 45th St., New York 17, N. Y.—ZZP, ZZV
Beeland Co., Charles D., Walton Bldg., Atlanta 3, Ga. —ZZE, ZZS, ZZT, ZZP, ZZA, ZZB, ZZZ
Beta Electronics Co., 1762 Third Ave., New York 29, N. Y.—ZZC
Bibletone Records, 354 4th Ave., New York 10, N. Y. —ZZL
Bray Studios, 729 7th Ave., New York 19, N. Y.—ZZE, ZZZ, ZZP, ZZA, ZZB
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British Information Service, 30 Rockefeller Plaza, New York 20, N. Y.—ZZJ
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Calvin Mfg. Co., E. 15th St., Kansas City, Mo.—ZZZ
Camera Equipment Co., 1600 Broadway, New York 19, N. Y.—ZZX
Capitol Records Inc., Sunset & Vine, Hollywood 28, Calif.—ZZY, ZZV, ZZL
Caravel Films, Inc., 1336 Book Bldg., Detroit 26, Mich.—ZZZ
Cardinal Co., 6000 Sunset Blvd., Hollywood 28, Calif. —ZZT, ZZP, ZZA, ZZZ
Cascade Pictures of Calif., 8822 Washington Blvd., Culver City, Calif.—ZZZ
C & G Film Effects, 723 7th Ave., New York 19, N. Y. —ZZZ, ZZA, ZZE, ZZB
Church Productions, Arthur B., Pickwick Hotel, Kansas City 6, Mo.—ZZZ, ZZJ, ZZP
Cinecraft Productions Inc., 2215 Franklin Ave., Cleveland 13, Ohio—ZZA, ZZE, ZZB, ZZZ
Cineffects, Inc., 115 W. 45th St., New York 19, N. Y. —ZZE
Cinemart, Inc., 101 Park Ave., New York 17, N. Y.— ZZE, ZZS, ZZT, ZZB
Cinema Research Corp., 7000 Romaine St., Hollywood 38, Calif.—ZZF, ZZE
Cine-Tele, 1161 N. Highland Ave., Hollywood 38, Calif. ZZF, ZZE, ZZB
Classophone, Inc., 35-05 36th St., Long Island City 1, N. Y.—ZZL
Colburn Laboratory, Geo. W., 164 N. Wacker Drive, Chicago 6, Ill.—ZZF, ZZE, ZZS, ZZT, ZZB
Colonial Films, 2118 Mass. Ave., N. W., Washington 8, D. C.—ZZK, ZZF, ZZE, ZZS, ZZT, ZZN, ZZP, ZZA, ZZB, ZZZ
Columbia Records, Inc., 1473 Barnum Ave., Bridgeport, Conn.—ZZL, ZZV
Columbia Transcriptions, 799 7th Ave., New York 19, N. Y.—ZZV
Commercial Radio Monitoring Co., P. O. Box 7037, Kansas City, Mo.—ZZQ
Commercial Radio Sound Corp., 231 E. 47th St., New York, N. Y.—ZZC
Commonwealth Pictures Corp., 723 Seventh Ave., New York 19, N. Y.—ZZJ
Cowan, Inc., Louis G., 485 Madison Ave., New York 22, N. Y.—ZZP, ZZZ, ZZA
Culhane Productions, Shamus, 440 W. 34th St., New York, N. Y.—ZZJ, ZZP, ZZZ, ZZA

Damon Recording Studios, Inc., 1221 Baltimore Ave., Kansas City 6, Mo.—ZZB, ZZZ, ZZV
Day Productions, Gordon M., 108 E. 30th St., New York 16, N. Y.—ZZV, ZZA, ZZP, ZZZ
Decca Records Inc., 50 W. 57th St., New York 19, N. Y.—ZZY, ZZV
Disney Productions, Walter, Burbank, Calif.—ZZZ
Dudley Pictures Corp., 9908 Santa Monica Blvd., Beverly Hills, Calif.—ZZA, ZZZ
Dunn Studios, Cal., 104 S. Michigan Ave., Chicago 3, Ill.—ZZA, ZZB, ZZZ, ZZP
Dynamic Films, Inc., 112 W. 89th St., New York 24, N. Y.—ZZK, ZZE, ZZS, ZZT, ZZN, ZZZ, ZZB, ZZA

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Eidson Electronic Co., P. O. Box 31, Temple, Texas— ZZQ

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Famous Artists Corp., California Bank Bldg., Beverly Hills, Calif.—ZZZ
Federal Artists Corp., 8734 Sunset Blvd., Hollywood 46, Calif.—ZZP
Federated Television Productions, 41 E. 41 St., New York 17, N. Y.—ZZE, ZZS, ZZT, ZZA, ZZZ
Filmack Corp., 1327 S. Wabash Ave., Chicago 5, Ill.— ZZF, ZZE, ZZS, ZZT, ZZL, ZZZ, ZZA, ZZB
Film Associates, Inc., 440 E. Schantz Ave., Dayton 9, Ohio.—ZZA, ZZZ
Filmeffects of Hollywood, 1153 N. Highland Ave., Hollywood, Calif.—ZZH, ZZA, ZZD
Film Equities Corp., 1501 Broadway, New York 19, N. Y.—ZZA, ZZZ
Film Features Associates, 330 W. 95 St., New York 25, N. Y.—ZZZ, ZZA, ZZP
Film Graphics, Inc., 245 W. 55 St., New York, N. Y. —ZZZ, ZZA

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Films for Industry, 135 W. 52nd St., New York 19, N. Y.—ZZZ

Five Star Productions, 6526 Sunset Blvd., Hollywood 28, Calif.—ZZZ, ZZA, ZZP

Flexon Products Corp., 249 W. 34th St., New York 1, N. Y.—ZZE, ZZH

Flory Films, Inc., 303 E. 71st St., New York 21, N. Y. —ZZP, ZZF, ZZE, ZZS, ZZT, ZZL, ZZZ, ZZA, ZZB

Fox Movietone News, 460 W. 54th St., New York, N. Y. —ZZN, ZZZ

Funt Radio Productions, Allen A., 100 Central Park S., New York 17, N. Y.—ZZA, ZZZ

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General Pictures Productions, Inc., 621 Sixth Ave., Des Moines 9, Iowa.—ZZF, ZZE, ZZZ, ZZB

Gates Radio Co., Quincy, Ill.—ZZC

Goodman Radio & TV Productions, Harry S., 19 E. 53rd St., New York 22, N. Y.—ZZZ, ZZA, ZZP, ZZT

Gotham Recording Corp., 2 W. 46th St., New York, N. Y. —ZZS, ZZL, ZZP, ZZV

Gray-O'Reilly Studios, 480 Lexington Ave., New York, N. Y.—ZZA, ZZZ

Handy Organization, Jam, 2821 E. Grand Blvd., Detroit 11, Mich.—ZZZ

Hartley Productions, 20 W. 47th St., New York 19, N. Y.—ZZZ, ZZP

Harvard Film Service, 421 Washington St., Somerville, Mass.—ZZZ, ZZA, ZZP

Hathen Productions, 246 S. Van Pelt St., Philadelphia, Pa.—ZZZ, ZZJ

Hayes-Parnell Productions, 6000 Sunset Blvd., Hollywood 28, Calif.—ZZZ, ZZP

Helm, E. "Tex", 407 S. Canal St., Carlsbad, N. Mex.—ZZN

Howell Recording Studio, 2703 Delaware Ave., Buffalo 17, N. Y.—ZZS, ZZB, ZZV

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Imperial Chemical Industries of N. Y. Ltd., 521 5th Ave., New York 17, N. Y.—ZZU

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International Derrick & Equip. Co., 875 Michigan Ave., Columbus 8, Ohio—ZZC

International Movie Producers' Service, 515 Madison Ave., New York 22, N. Y.—ZZE, ZZS, ZZT, ZZL, ZZA, ZZR

International News Service, 235 E. 45th St., New York 17, N. Y.—ZZN

International Trans-Video, 61 E. 52nd St., New York 14, N. Y.—ZZZ, ZZP

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Kin-O-Lux, Inc., 105 W. 40th St., New York 18, N. Y. —ZZF

Kling Studios, Inc., 601 N. Fairbanks Court, Chicago 11, Ill.—ZZA, ZZZ

Knickerbocker Productions, 1600 Broadway, New York 19, N. Y.—ZZZ, ZZA

K & S Films, 50 N. West St., Indianapolis 2, Ind.—ZZE, ZZS, ZZT, ZZP, ZZA, ZZB, ZZZ

Libra Films Distributors, 6525 Sunset Blvd., Hollywood 28, Calif.—ZZE, ZZB, ZZR, ZZN, ZZA, ZZZ, ZZJ

Lang-Worth Feature Programs, 113 W. 57th St., New York 19, N. Y.—ZZP, ZZT, ZZL, ZZB

Lehman, Harry, 1161 N. Highland Ave., Hollywood 38, Calif.—ZZZ, ZZA

Lloyds Film Storage Corp., 729 Seventh Ave., New York, N. Y.—ZZR, ZZH

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Loucks & Norling Studios, 245 W. 55 St., New York, N. Y.—ZZA, ZZP, ZZZ

McCollum Picture Productions, 4557 Produce Plaza W., Los Angeles 58, Calif.—ZZF, ZZE, ZZT, ZZB, ZZP, ZZA, ZZZ

Mannon Sound Stages, Inc., 112 W. 89th St., New York 24, N. Y.—ZZE, ZZS, ZZT, ZZB, ZZG

Maurer, Inc., J. A., 37-01 31st St., Long Island City 1, N. Y.—ZZF, ZZE

Maxson Corp., W. L., 460 W. 34th St., New York 1, N. Y.—ZZC

Maxwell Associates, Robert, 480 Lexington Ave., New York 17, N. Y.—ZZP, ZZZ

Michigan Film Library, 15745 Rosemount, Detroit 23, Mich.—ZZJ

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Murphy-Lillis Productions, 59 Park Ave., New York 16, N. Y.—ZZA, ZZZ

National Cine Equipment, Inc., 20 W. 22nd St., New York 10, N. Y.—ZZB

National TV Laboratories, 4350 Lankersheim Blvd., N. Hollywood 16, Calif.—ZZA, ZZZ

Nemeth Studios, Ted, 729 7th Ave., New York 19, N. Y. ZZA, ZZZ

Nilsson Electrical Laboratory, 103 Lafayette St., New York 13, N. Y.—ZZI

Nu-Art Films, Inc., 145 W. 45 St., New York 19, N. Y.—ZZZ

Official Television, Inc., 25 W. 45 St., New York 19, N. Y.—ZZA, ZZZ

Packaged Programs, 211 Smithfield St., Pittsburgh 22, Pa.—ZZE, ZZT, ZZB, ZZZ, ZZP

Paramount TV Productions, Inc., 1501 Broadway, New York 18, N. Y.—ZZT, ZZU, ZZK

Pathe Laboratories, 105 E. 106 St., New York, N. Y.—ZZE, ZZF

Pathescope Co. of America, 580 Fifth Ave., New York 19, N. Y.—ZZA, ZZZ

Peerless Film Processing Corp., 165 W. 46 St., New York 19, N. Y.—ZZF

Precision Film Laboratories, 21 W. 46 St., New York 19, N. Y.—ZZF, ZZE

Princeton Film Center, Princeton, N. J.—ZZE, ZZS, ZZT, ZZN, ZZP, ZZA, ZZB, ZZZ

Producers Service Co., 2815 W. Olive Ave., Burbank, Calif.—ZZR, ZZH

Radio Corp. of America, RCA-Victor Div., Camden, N. J. —ZZK

Radio Recorders, 7000 Santa Monica Blvd., Hollywood, Calif.—ZZE, ZZS, ZZL, ZZB, ZZG, ZZY

RCA Recorded Program Services, 120 E. 23 St., New York 10, N. Y.—ZZP, ZZV, ZZB, ZZL

Recorders Labs., 6916 Santa Monica Blvd., Hollywood 38, Calif.—ZZL, ZZB, ZZY, ZZV

Reeves Soundcraft Corp., 35-54 36 St., Long Island City 6, N. Y.—ZZU

Reeves Sound Studios, 304 E. 44 St., New York 19, N. Y.—ZZB, ZZA, ZZG, ZZE, ZZS, ZZV

RKO-Pathe, 625 Madison Ave., New York 22, N. Y.— —ZZA, ZZZ

Roach Studios, Hal, 8822 Washington Blvd., Culver City, Calif.—ZZA, ZZZ

Rochemont Assoc., Louis de, 35 W. 45th St., New York, N. Y.—ZZA, ZZZ, ZZJ

Rousch Productions, Leslie, 119 W. 57 St., New York 19, N. Y.—ZZA, ZZZ

Royal Recording Co., 601 Ashby Ave., Berkeley 10, Calif.—ZZB, ZZS

Ruby Film Co., 729 Seventh Ave., New York, N. Y.— ZZJ, ZZE, ZZR

Sackett Productions, Bernard L. Bankers Securities Bldg., Philadelphia 7, Pa.—ZZP

Sarra, Inc., 200 E. 56 St., New York, N. Y.—ZZA, ZZZ

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Sesac, Inc., 475 Fifth Ave., New York 17, N. Y.—ZZL, ZZP

Sherwood Pictures Corp., 1569 Broadway, Brooklyn 7, N. Y.—ZZP, ZZJ

Simmel-Meservey, Inc., 321 S. Beverly Dr., Beverly Hills, Calif.—ZZT, ZZL, ZZP, ZZZ, ZZJ

Skiatron Corp., 381 Fourth Ave., New York, N. Y.— ZZU

Souvaine Co., 30 Rockefeller Plaza, New York 20, N. Y. —ZZP

Sun Dial Films, 341 E. 43 St., New York 17, N. Y.— ZZE, ZZS, ZZT, ZZP, ZZA, ZZB

Swank Films, 19 W. Fourth St., Dayton 2, Ohio—ZZT

Tape Recording Apparatus Co., Box 221, Caldwell, N. J. —ZZG

Technicolor Motion Picture Corp, Hollywood, Calif.— ZZZ, ZZF

Telefilm, Inc., 6039 Hollywood Blvd., Hollywood 28, Calif.—ZZA, ZZZ, ZZK, ZZF, ZZE, ZZS, ZZT, ZZL, ZZB

Telemated Cartoons, 70 E. 45 St., New York 17, N. Y. —ZZE, ZZT, ZZZ

Telenews Productions, 603 Ninth Ave., New York, N. Y. —ZZN

Telepix Corp., 6233 Hollywood Blvd., Hollywood 28, Calif.—ZZE, ZZS, ZZT, ZZL, ZZP, ZZJ, ZZB, ZZA, ZZZ, ZZY, ZZI

Teletran, 480 Lexington Ave., New York 17, N. Y.—ZZZ

Television Cartoons, Inc., 361 W. Broadway, New York 13, N. Y.—ZZA, ZZB, ZZJ, ZZZ, ZZE

Television Screen Productions, 17 E. 45 St., New York 17, N. Y.—ZZA, ZZZ

Tempo Record Co. of America, 8540 Sunset Blvd., Hollywood 28, Calif.—ZZL

Transfilm, Inc., 35 W. 45 St., New York 19, N. Y.— ZZA, ZZZ

Trans-Lux Corp., 1270 6th Ave., New York 20, N. Y.— ZZH

Tressel Television Productions, 2214 E. 75 St., Chicago 49, Ill.—ZZT

Tri-State 16 mm. Productions, P. O. Box 112, Pittsburgh 30, Pa.—ZZE, ZZT, ZZP, ZZA, ZZB, ZZZ, ZZJ, ZZH

Twentieth Century Fox Co., 444 W. 56 St., New York, N. Y.—ZZA, ZZZ

United World Films, Inc., 1445 Park Ave., New York 22, N. Y.—ZZA, ZZZ

Universal Recorders, 6757 Hollywood Blvd., Hollywood 28, Calif.—ZZV, ZZB

Video Films, 1004 E. Jefferson Ave., Detroit 7, Mich.— ZZE, ZZT

Video Film Transcriptions, 3100 W. Magnolia St., Burbank, Calif.—ZZZ

Video Varieties Corp., 41 E. 50 St., New York 22, N. Y.—ZZA, ZZZ

Vista Productions, 12 E. 41 St., New York, N. Y.— ZZA, ZZZ

Vogue Wright Studios, 237 E. Ontario St., Chicago 11, Ill.—ZZE, ZZS, ZZT

West Coast Sound Studios, 510 W. 57 St., New York 19, N. Y.—ZZZ, ZZA, ZZT

Wheeler Laboratories, 259-09 Northern Blvd., Great Neck, L. I., N. Y.—ZZC

Wilding Picture Productions, 1345 Argyle St., Chicago 40, Ill.—ZZA, ZZZ

Winik Films, Inc., 625 Madison Ave., New York, N. Y. —ZZA, ZZZ

Woodruff Associates, 328 E. 38 St., New York 16, N. Y. —ZZE, ZZS, ZZT, ZZD

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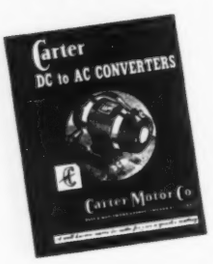

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VanEps Laboratory, Fred—16
VanNostrand Co., D.—29
Varian Assoc.—8
Varo Mfg.—4, 27, 28, 33
Vesto Co.—6
VFB Line Corp.—25
Vickers Inc.—25
Victor Animatograph—10
Victorlite Industries—12
Vidcraft Television—1
Video Corp. of America—1
Videodyne Inc.—1
Video Film Transcriptions—32
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Video Products Corp.—1
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Wells Sales—5
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Westline Electronics—1, 3, 4
Weston Electrical Instrument—4, 11, 25, 26, 27
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Workshop Assoc.—2, 3, 4, 6, 8
World Broadcasting System—32
WOR Recording Studios—32
Yardney Electric—31
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(*Continued from page 78*)

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Commanding Officer, Naval Air Station, Miami
Commanding Officer, Naval Mine Counter Measures Station, Panama City
Supply Officer, Naval Air Station, Pensacola

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(*Continued on page 84*)

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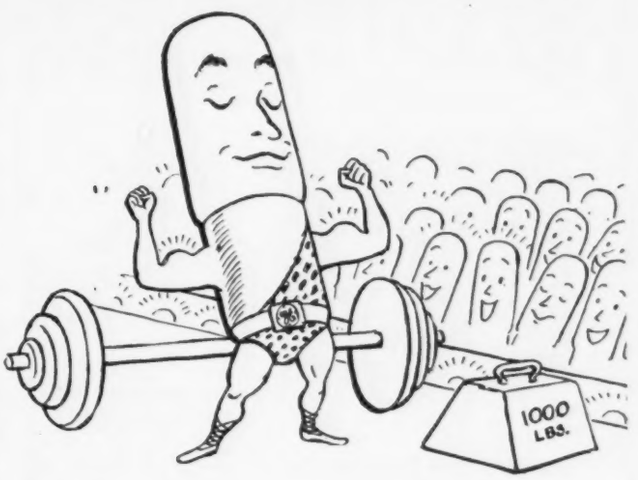

LIGHTING radio and television dials is no job for a "weakling" lamp. Testing many old style lamps, General Electric engineers found that certain frequencies caused severe vibration that often tore the filament apart.

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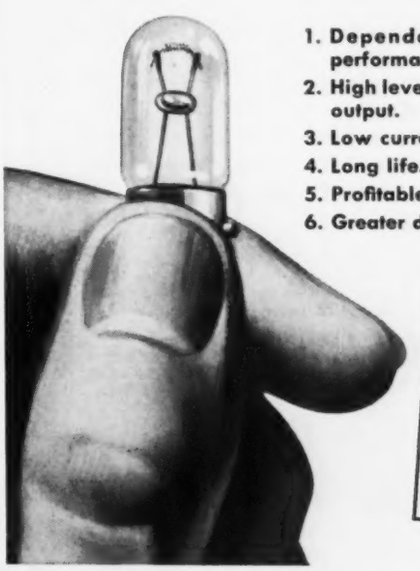

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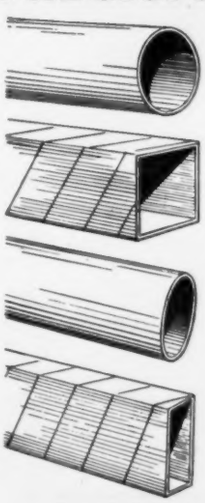

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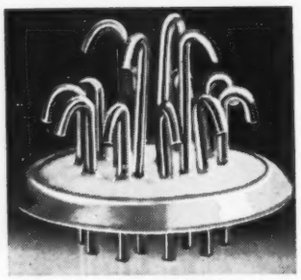
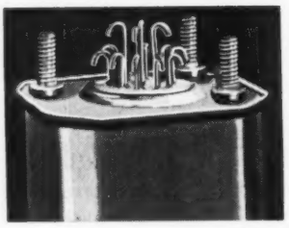


PLUS ASSEMBLY



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(Continued from page 82)

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MC Recruit Depot, Post Supply, San Diego
Depot Quartermaster, MC Depot of Supplies, 100 Harrison St., San Francisco
DISTRICT OF COLUMBIA
Quartermaster General, Headquarters Marine Corps, Washington
NORTH CAROLINA
Depot Quartermaster, MC Depot of Supplies, Camp Lejeune
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NEW JERSEY
Signal Corps Procurement Agency, Laboratory Office, Bldg., 923, Ft. Monmouth
NEW YORK
Signal Corps Procurement Agency, Photographic Center Office, 35-11 35th Ave., Long Island City 1
PENNSYLVANIA
Signal Corps Procurement Agency, 2800 S. 20th St., Philadelphia 45

Consulting Radio Engineers and Radio Associations

A nation-wide directory of Radio Consulting Engineers and associations active in Radio and Television, will appear in the July issue of TELE-TECH.

Mobilization

(Continued from page 18)

which was advocated earlier (see cover).

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NOTICE!

IF YOU OPERATE ANY WESTERN ELECTRIC TRANSMITTER

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1 Amp D.C	0-1	"Amperes D.C. Total Plate"	Self contained	8304	$17.50
1 Amp D.C.	0-1	"Amperes DC 1 KW Plate"	Self contained	13768	$17.50
2 Amp D.C.	0-2	"Amperes DC 3 KW Plate"	Self contained	13675	$17.50
3 Amp D.C.	0-3	"Amperes DC 10 KW Plate"	Self contained	13676	$17.50
300 MA RF	0-300	"Volts RF Transmission Line"	With internal vacuum couple	13605	$27.50
5 Amp R.F.	0-5	"Amperes RF Transmission Line"	Less Thermocouple	8305	$17.50
5 Amp R.F.	0-5	"Amperes RF Antennae"	With external thermocouple	8306	$27.50
5 Amp R.F.	0-8	"Amperes RF Antennae"	With 5 ampere couple	8312	$27.50
6 Amp R.F.	0-6	"Amperes RF Antennae"	With external couple	8313	$27.50
6 Amp R.F.	0-6	"Amperes RF Transmission Line"	With external thermocouple	8305	$27.50
4 KV D.C.	0-4	"Kilovolts DC Amplifier Plate"	1 MA, with tubular multiplier	13606	$22.50
4 KV D.C.	0-4	"Kilovolts DC 1 KW Plate"	1 MA, with tubular multiplier	13769	$22.50
10 KV D.C.	0-10	"Kilovolts DC 10 KW Plate"	1 MA, with tubular multiplier	13638	$30.00
12.5 KV D.C.	0-12.5	"Kilovolts DC Power Amp Plate"	1 MA, with tubular multiplier	13677	$32.50
6 MA D.C.	0-4	"Kilowatts R.F. Output"		13744	$17.50
10 MA D.C.	0-12	"Kilowatts R.F. Output"		13745	$17.50
300 V A.C.	0-300	"Volts A.C. Power Supply"	Self contained	8302	$20.00
		DC & RF model 252, AC model 260			
1 Amp D.C.	0-1	"Amperes DC 1. KW Plate"	Self contained	13768	$17.50
2 Amp D.C.	0-2	"Amperes. DC 3 KW Plate"	Self contained	13675	$17.50
3 Amp D.C.	0-3	"Amperes DC 10 KW Plate"	Self contained	13676	$17.50
300 MA R.F.	0-300	"Volts RF Transmission Line"	With internal vacuum couple	13605	$27.50
4 KV D.C.	0-4	"Kilovolts DC Amplfier Plate"	1MA movement, tubular multiplier	13606	$22.50
4 KV D.C.	0-4	"Kilovolts DC 1 KW Plate"	1MA movement, tubular multiplier	13769	$22.50
5 KV D.C.	0-5	"Kilovolts DC 3 KW Plate"	1MA movement, tubular multiplier	13770	$25.00
12.5 KV D.C.	0-12.5	"Kilovolts DC Power Amp Plate"	1MA movement, tubular multiplier	13677	$32.50
6 MA D.C.	0-4	"Kilowatts R.F. Output"		13744	$17.50
10 MA D.C.	0-12	"Kilowatts R.F. Output"		13745	$17.50
300 V A.C.	0-300	"Volts A.C. Power Supply"	Self contained	8302	$20.00
		DC & RF model SX, AC model SY			
1 Amp D.C.	0-1	"Amperes DC Total Plate"	Self contained	8304	$17.50
300 MA R.F.	0-300	"Volts RF Transmission Line"	With internal vacuum couple	13605	$27.50
500 MA R.F.	0-1000	"Volts RF Power Amp Trans. Line"	With internal vacuum couple	ESA#680437	$27.50
6 Amp D.C.	0-6	"Amperes RF Transmission Line"	With external couple	8307	$27.50
4 KV D.C.	0-4	"Kilovolts DC Amplifier Plate"	1MA,with tubular multiplier	13606	$22.50
5 KV D.C.	0-5	"Kilovolts DC Amplifier Plate"	1MA,with tubular multiplier	8303	$25.00
10 KV D.C.	0-10	"Kilovolts DC Power Amp Plate"	1MA,with tubular multiplier	ESA#680434	$30.00
300 V A.C.	0-300	"Volts A.C. Power Supply"	Self contained	8302	$20.00

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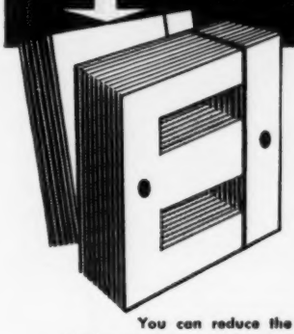

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Thyrite may be the answer to some of your circuit problems. It is a silicon-carbide ceramic material, dense and mechanically strong, having nonlinear resistance characteristics—the resistance varying as a power of the applied voltage. Its resistance characteristic is stable, and substantially independent of polarity or frequency. Thyrite® has been used for many years in important applications, including electronic. It can be produced in various shapes and sizes (those which can be successfully molded).

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For protective purposes (to limit voltage surges).

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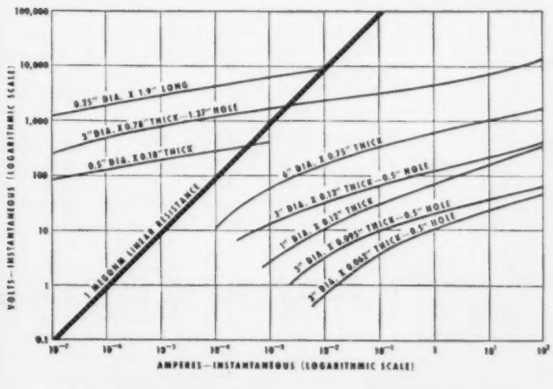
For the control of voltage-selective circuits, either independent of or in combination with electronic devices.



Typical volt-ampere characteristics of Thyrite resistors of several resistance levels and power ratings. Note that the nonlinear voltage-current characteristic extends over an extremely wide current range. Compare it with the characteristic (heavy line) of a 1-megohm linear resistor. Apparatus Dept., General Electric Company, Schenectady 5, N. Y.

Contact your nearest G-E office for additional data or address Transformer & Allied Product Divisions, General Electric Company, Pittsfield, Mass.

GENERAL ELECTRIC

factors should war ever come.

The scales and magnitudes of the preceding sketches have been so chosen as not to violate our National Security.

Next month's issue will have a discussion of the technics of the Leontief Input-Output analysis and its application to the industry.

Noise Generator

(*Continued from page* 28)

the noise generator at the desired frequency should approximate Fig. 3 as closely as possible.

At high frequencies the inherent tube (and circuit) capacitive reactance is not negligible and an inductance must be used to resonate with this capacitance. Such as arrangement is shown in Fig. 4 for a generator to be used with an unbalanced receiver input. Fig. 5 illustrates an arrangement that has the balanced output.

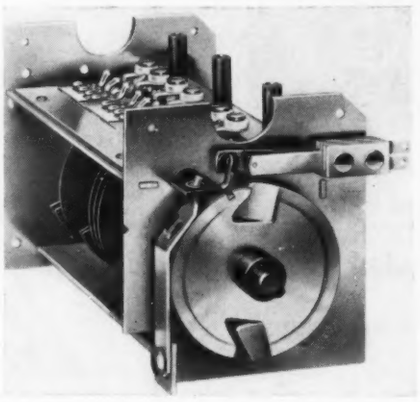
[9]E. G. Fubini, D. C. Johnson "Signal-to-Noise Ratio in AM Receivers", **Proc. IRE,** Vol. 36, p. 1461, Dec. 1948.

FM-TV Tuner

(*Continued from page* 23)

FM. Operating stability was reached at an average time of six minutes for the five test points after which only slight deviations were noted.

The tuner permits reception of the FM radio band plus the TV bands with single knob control. The picture tube circuit is automatically disabled by a multi-contact switch



Rear view of tuner showing cam arrangement for hi and lo channel switching together with an extra switch mounted on the frame for phono operation with TV disabled

when the FM band is being tuned. Additional contacts are available on this switch to permit incorporation of any power saving features desired or to provide automatic switching to a phonograph position.

(*Continued from page* 79)

Product	Section No.	Code Letter
System, radio cueing	9	SD
TV RF distribution	7	EQ
ground	6	CG
intercom., misc.	3	MI
aviation	4	AI
studio	9	SF
landing, airborne	4	AL
landing, ground	4	AS
reinforcement, sound	9	SR
switching, camera field	13	WS
switching camera, studio	7	EW
Tape	21	QT
Testers, tube	25	YG
Towers, supporting	6	CS
Transceivers	3	MV
Transcription making	32	ZZV
Treatment, sound	24	XB
Tripods, field	13	WK
studio	7	EK
Transmitters, aviation	4	AT
STL	7	LT
broadcast, H. F. gov. comm.	28	VVB
FM broadcast	1	TF
remote	2	PF
micro-wave	13	WT
TV broadcast	1	TV
remote	2	PV
Tubes, audio studio	5	VA
cathode-ray	5	VC
receiving	5	VB
rectifier	5	VR
special type	5	VS
transmitting	5	VT
video, studio	5	VV
Turntables, multispeed	16	JE
recording	16	JD
Tweeters	24	XT
Transformers	27	UUT
Units, inductor, decade	25	YYH
isolation	6	CU
TV projection	7	EY
phasing & tuning	6	CP
Viewfinders	12	GD
Voltmeters, vacuum tube	25	YV
Volt-ohm-milliammeters	25	YH
Walkie-talkies	3	MW

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720-20

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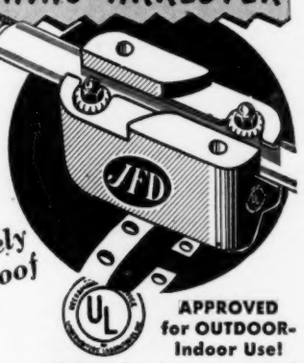

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